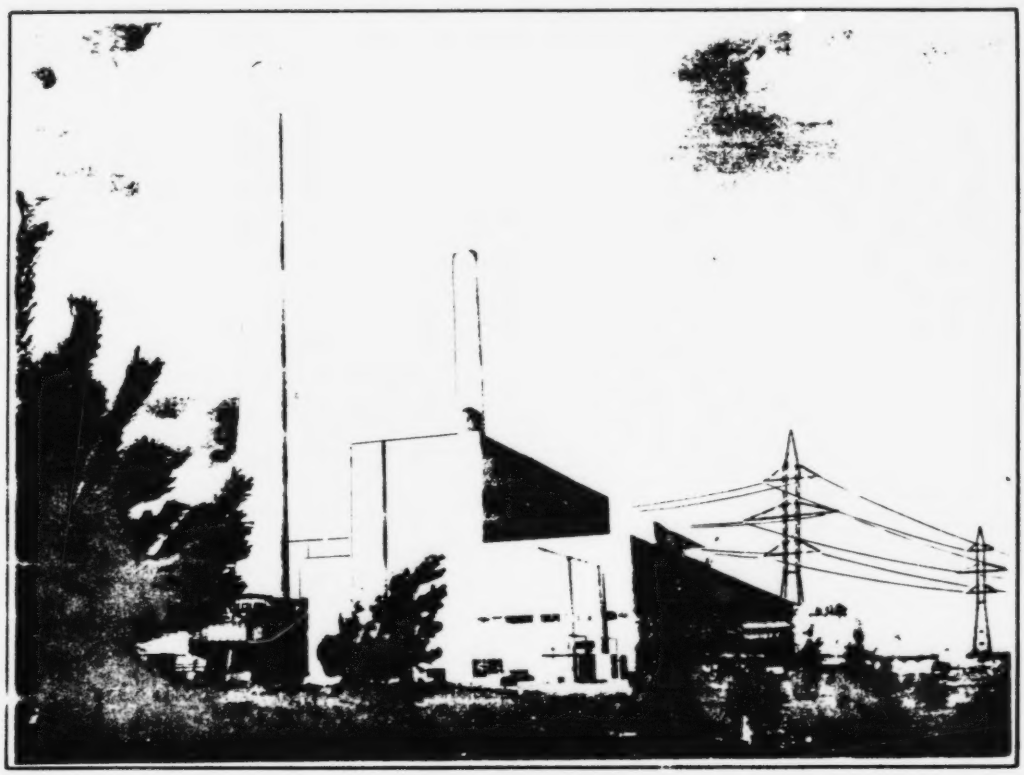
CANADIAN ELECTRIC UTILITIES

Analysis of Generation and Trends 1981



National Energy Board
April 1983

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INTRODUCTION

This report is a continuation of a series of reports that have been published annually by the Board since 1971 (Ref. 1-2).

It covers the generation of electric energy by Canadian electrical utilities during the calendar year 1981, and gives Canadian totals with the provincial breakdown together with an analysis of fuel consumption and thermal generating plant heat rates. Historical trends for the period 1977 to 1981 inclusive are described.

The report also includes a summary of utility fueling costs by fuel type. These, it should be noted, include only accounting costs incurred for fuels as reported by electrical utilities. In some cases, these do not reflect local market rates for such fuels.

The analysis presented in this report does not include the 39 720 GW.h (10.4 percent of the Canadian total) that were generated in 1981 by approximately 6 293 MW of installed capacity owned by industrial establishments (Ref. 5).

The report uses data submitted by the electrical utilities to Statistics Canada (Ref. 3-6). The National Energy Board received the final 1981 data from Statistics Canada in February 1983. The data are manipulated and consolidated by computer program. Since the report deals with net station output into the electrical utility grid system, excluding station service, negative generation figures occur occasionally where a plant has used more electricity than it produced.

NOTE ON METRIC CONVERSION

As of 1980, the data in this report have been presented in the International System of Units (SI), consistent with the data received from Statistics Canada. The following table serves to illustrate some conversion factors and metric equivalents.

Approximate Conversion Factor

S.I. Units	Imperial Units
1 cubic metre (m^3)	= 35.3 cubic feet
1 cubic metre (m^3)	= 6.3 barrels
1 litre (L)	= 0.22 gallons
1 kilogram (kg)	= 2.22 pounds
1 metric tonne	= 1.1023 short tons
1 gigajoule (GJ)	= 0.95 Million Btu

Metric Equivalents

1 megagram (mg)	= 1 metric tonne
1 kilolitre	= 1 cubic metre

1. CANADIAN UTILITY GENERATION

The total Canadian utility installed capacity at the end of 1981 was 77 409 MW (Ref.5); the energy generation in 1981 was 340 376 GW.h. Figures 1.1(a) and (b) show, respectively, the breakdown of the capacity by type of generation and of the energy by type of source. Hydroelectric generation accounted for approximately 58 percent of capacity and 68 percent of energy production.

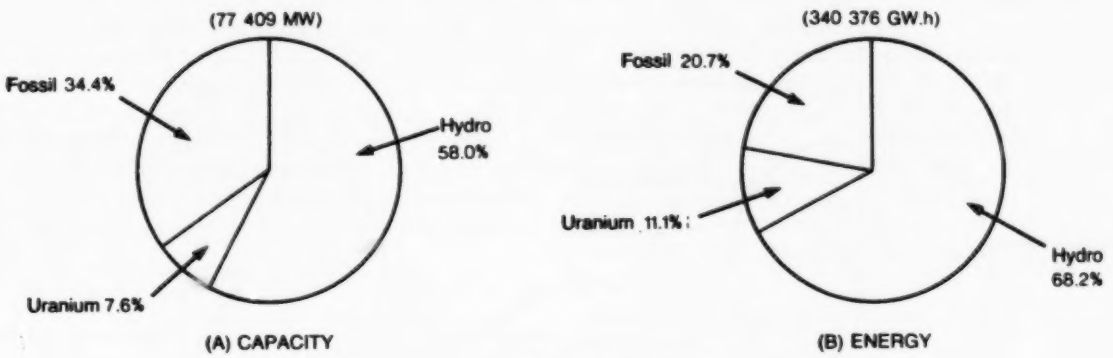


Fig. 1.1 Canadian Generation by Primary Energy Source

The installed capacity of each province at the end of 1981 and the energy generation in 1981 are shown in Figures 1.2(a) and (b) respectively. Detailed information is given in Tables 1.1, 1.2 and 1.3.

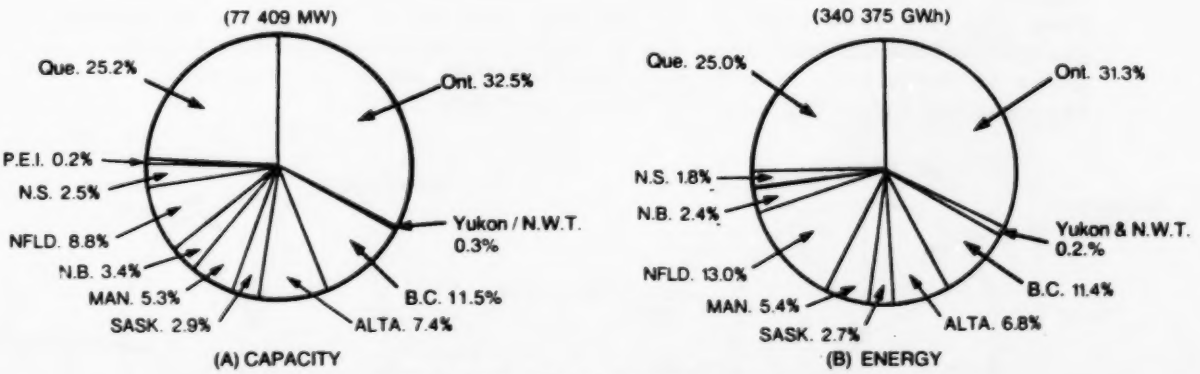


Fig. 1.2 Installed Capacity and Generation by Province

Figures 1.3(a) and (b) show the breakdown of the total Canadian fossil generating capacity and the energy production in 1981. Approximately 85 percent of the thermal electric energy generation was coal-fired steam generation, the remainder being largely split in approximately a two-to-one ratio between oil-fired and natural gas-fired steam generation. There was also a small amount of energy generated by oil-fired or gas-fired gas turbines and internal combustion engines. Details are given in Tables 1.4, 1.4A, 1.4B, 1.5 and 1.6. Steam multi-fuelled units burned combinations of two or more of coal, oil and gas.

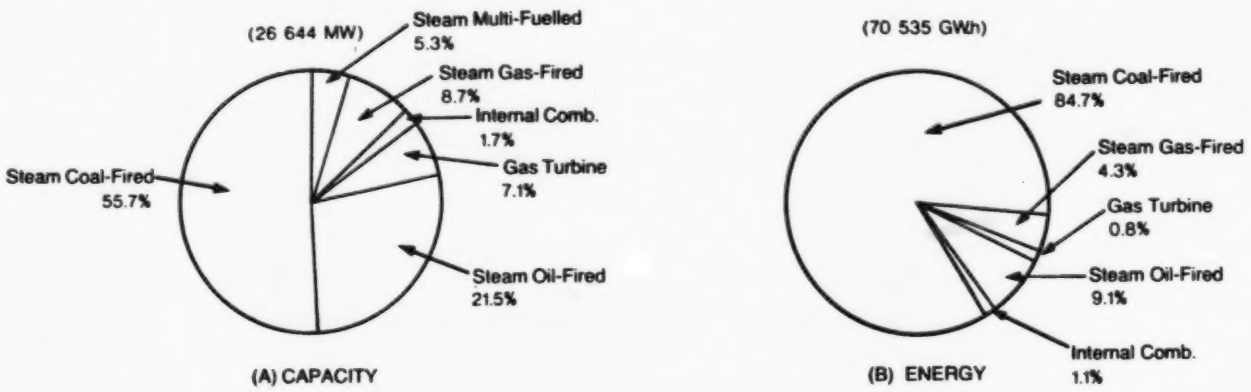


Fig. 1.3 Canadian Generation by Type of Fossil Fuelled Generation Units

Various types of coal and oil are used for power generation. Figures 1.4(a) and (b) show that 42 percent of the energy generated from coal was from imported bituminous coal, while 87 percent of energy generated from oil was from heavy fuel (residual) oil. Details are given in Table 1.7. Additional detailed 1981 Canadian generation information including costs is given in Table 1.8.

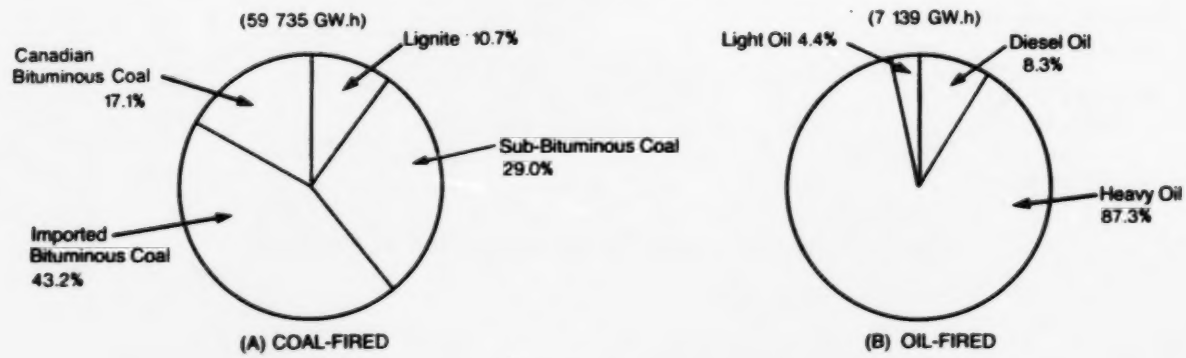


Fig. 1.4 Canadian Generation by Type of Coal and Oil

2. UTILITY GENERATION BY PROVINCE

Electrical utility generation by primary energy source for each province, and for the Yukon and Northwest Territories is illustrated graphically in Figures 2.1 to 2.12. More detailed 1981 generation information, including utility reported costs, is shown in Tables 2.1 to 2.12.

More than 98 percent of the electric energy produced by utilities in Newfoundland (including Labrador), Quebec, Manitoba, and British Columbia was generated from hydroelectric sources. Hydroelectric generation accounted for 75 percent of total generation in the Yukon, 49 percent in the Northwest Territories and 34 percent of total generation in Ontario. The balance of the energy was produced from fossil fuels, except in Ontario where 36 percent of the total was generated from uranium. In Prince Edward Island, Nova Scotia, New Brunswick, Saskatchewan and Alberta utility electric energy was generated predominantly from fossil fuels.

PROVINCIAL GENERATION BY PRIMARY ENERGY SOURCE

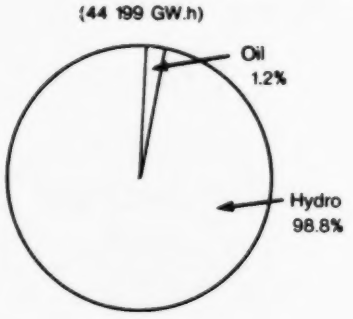


Fig. 2.1 Newfoundland

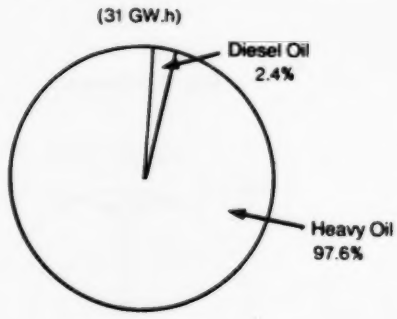


Fig. 2.2 Prince Edward Island

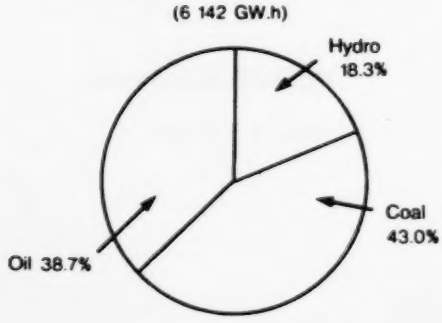


Fig. 2.3 Nova Scotia

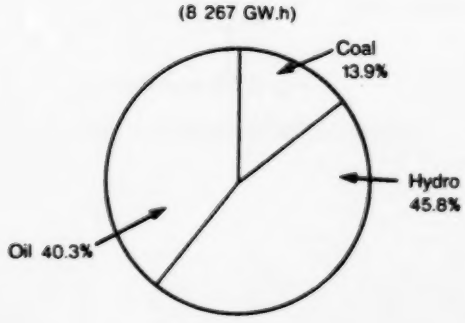


Fig. 2.4 New Brunswick

PROVINCIAL GENERATION BY PRIMARY ENERGY SOURCE

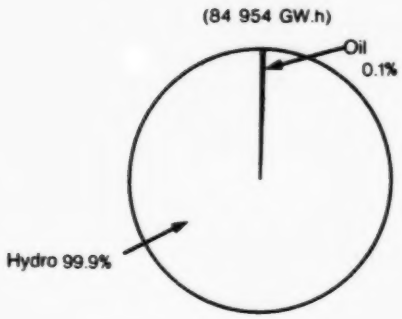


Fig. 2.5 Quebec

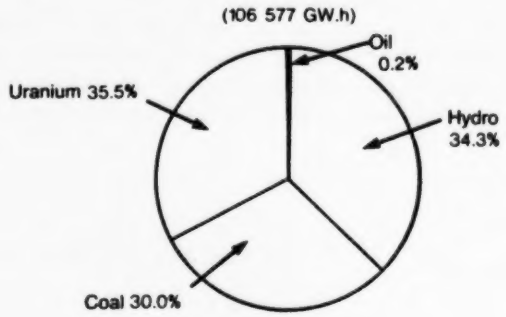


Fig. 2.6 Ontario

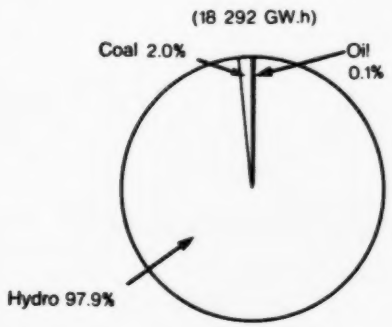


Fig. 2.7 Manitoba

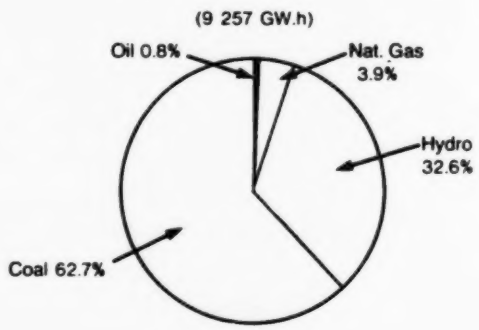


Fig. 2.8 Saskatchewan

PROVINCIAL GENERATION BY PRIMARY ENERGY SOURCE

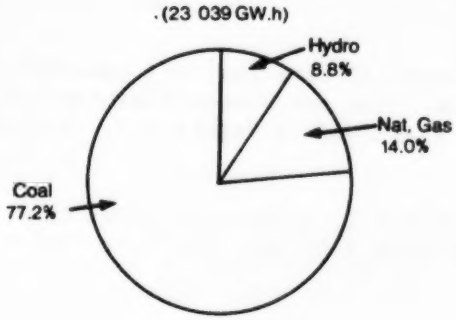


Fig. 2.9 Alberta

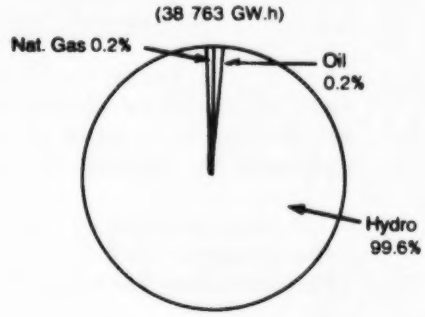


Fig. 2.10 British Columbia

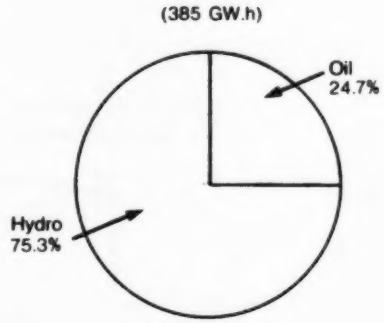


Fig. 2.11 Yukon

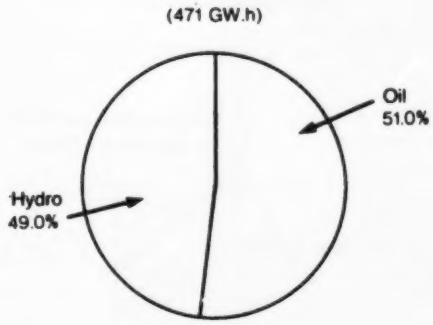


Fig. 2.12 Northwest Territories

3. FUEL CONSUMPTION BY PROVINCE

Fuel used in 1981 for thermal generation by Canadian electrical utilities included coal (subdivided into bituminous, sub-bituminous and lignite), oil (categorized by light, heavy and diesel), natural gas and uranium.

3.1 Coal

3.1.1 Bituminous Coal

A total of 13.4 million tonnes of this fuel was consumed in 1981 by Canadian electrical utilities. The percentage breakdown of bituminous coal used by province is displayed in Figure 3.1. Ontario consumed 84 percent of the total.

Details are provided in Table 3.1, which also shows that the 1981 average cost per tonne of bituminous coal was $47.93 or 19.6 mills ($0.0196) per kilowatt hour.

3.1.2 Sub-Bituminous Coal

The total consumption of sub-bituminous coal by Canadian electrical utilities in 1981 was 11.0 million tonnes. The fuel consumption breakdowns by province are displayed graphically in Figure 3.2. Alberta consumed 99 percent of the total.

Details are provided in Table 3.2, which also shows that the 1981 average cost was $6.89 per tonne or 4.35 mills per kilowatt hour.

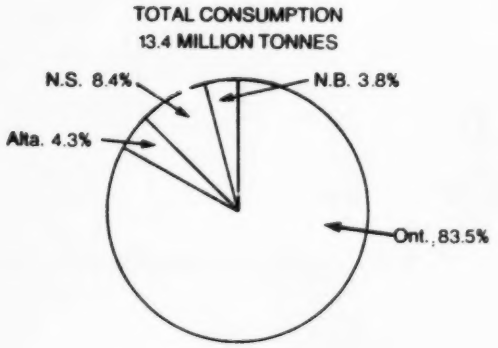


Fig. 3.1 Bituminous Coal

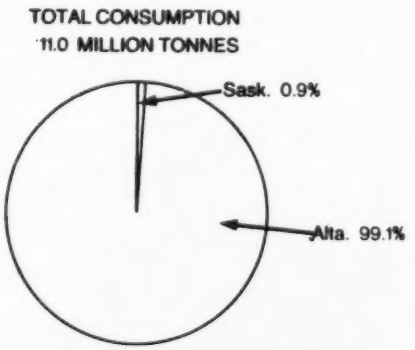


Fig. 3.2 Sub-Bituminous Coal

3.1.3 Lignite

Canadian consumption of lignite by electrical utilities in 1981 was 5.4 million tonnes. The provincial share in percent of total lignite fuel consumed is shown graphically in Figure 3.3. Saskatchewan consumed approximately 89 percent of the total.

Details are provided in Table 3.3, which also shows that the 1981 average cost per tonne of lignite was $8.12 or 6.94 mills per kilowatt hour.

3.2 Oil

3.2.1 Light Oil

About 85 thousands kilolitres of light oil were used by electrical utilities in Canada during 1981. The percentage breakdown by province is shown in Figure 3.4. Ontario consumed 36 percent of the total.

Details are provided in Table 3.4, which also shows that the average cost of light oil in 1981 was $250.26 per kilolitre or 67.1 mills per kilowatt hour.

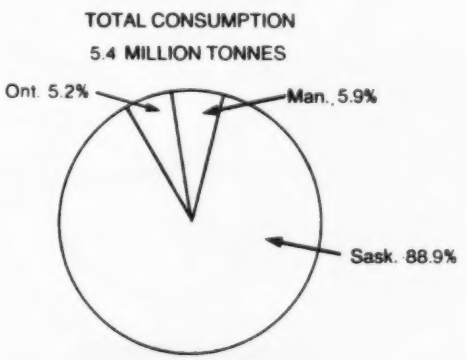


Fig. 3.3 Lignite

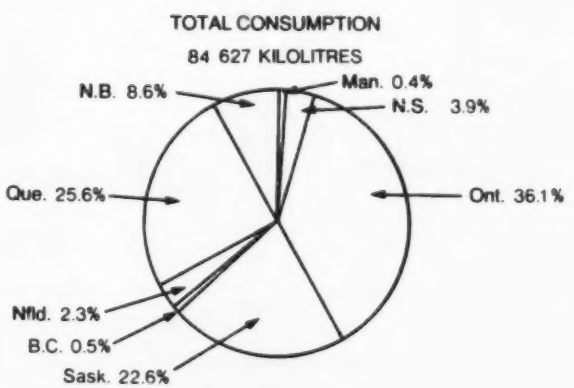


Fig. 3.4 Light oil

FUEL CONSUMPTION BY PROVINCE

3.2.2 Heavy Oil

About 1.7 million kilolitres of heavy oil were consumed by Canadian electrical utilities in 1981. The percentage breakdown of heavy fuel oil consumption by province is shown in Figure 3.5. New Brunswick consumed 54 percent, Nova Scotia 34 percent and Newfoundland 7 percent of the total.

Details are provided in Table 3.5 which also shows that the average cost in Canada in 1981 was $129.70 per kilolitre or 35.1 mills per kilowatt hour.

3.2.3 Diesel Oil

About 183 thousand kilolitres of diesel oil were consumed by Canadian electrical utilities in 1981. The provincial share as a percentage of total diesel oil used in Canada is shown graphically in Figure 3.6. All provinces consumed diesel oil, with the greatest portion of the total consumed in the Yukon and Northwest Territories.

Details are provided in Table 3.6, which also shows that the 1981 average cost of diesel oil was $268.44 per kilolitre or 83.6 mills per kilowatt hour.

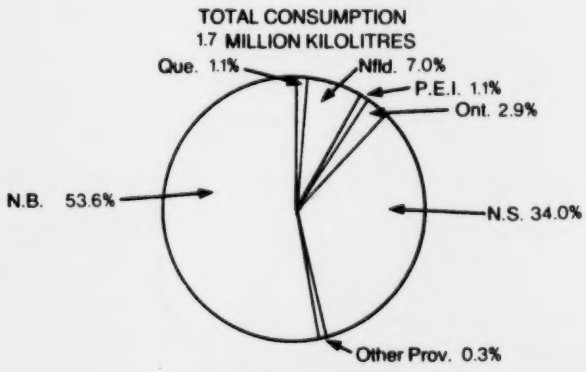


Fig. 3.5 Heavy Oil

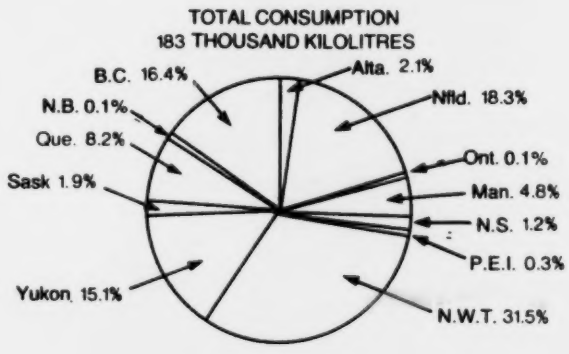


Fig. 3.6 Diesel Oil

FUEL CONSUMPTION BY PROVINCE

3.3 Natural Gas

In 1981, about 1.4 billion cubic metres of natural gas were used by Canadian electrical utilities. The percentage breakdown of natural gas consumption by province is shown in Figure 3.7. Alberta consumed 80 percent of the total.

The 1981 average cost of natural gas in Canada was $45.79 per thousand cubic metres, or 17.9 mills per kilowatt hour. Details are provided in Table 3.7.

3.4 Uranium Fuel

Canadian electrical utilities used 677 100 kilograms of contained uranium in 1981. As Figure 3.8 shows, all uranium consumption for power generation in 1981 occurred in Ontario.

Table 3.8 shows that the average cost of uranium fuel was $149.37 per kilogram of contained uranium, or 2.68 mills per kilowatt hour.

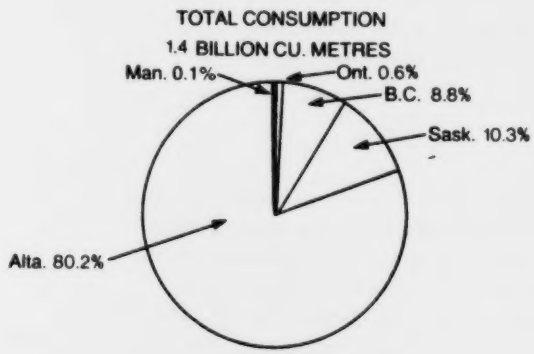


Fig. 3.7 Natural Gas

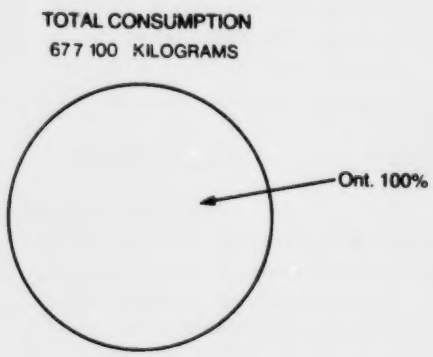


Fig. 3.8 Uranium Fuel

FUEL CONSUMPTION BY PROVINCE

4. ACTUAL NET STATION HEAT RATES

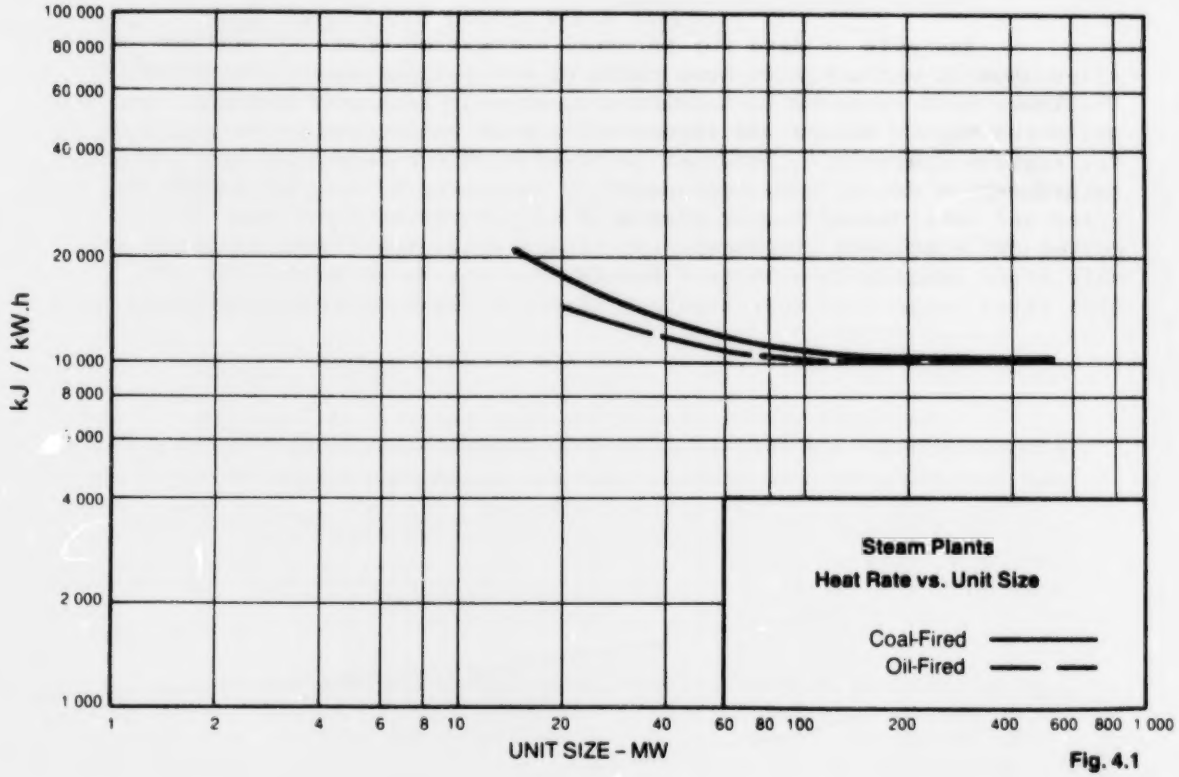
The efficiency of thermal generating stations can be measured in terms of their respective heat rates in kJ/kW.h. Net station heat rates are obtained by dividing the gross kJ input to a station by its net generation (net station generation is equal to the gross station generation less the station service load). For presentation purposes, the actual net station heat rates are plotted against unit size based on the nameplate rating of the largest unit in the respective plant. The curves are presented in Figures 4.1, 4.2 and 4.3 for various types of generating stations. These curves should be used with caution as they reflect actual net station heat rates in 1981 obtained under actual operating conditions and are not to be confused with design rate curves for various types and sizes of thermal units. Because of insufficient data, no curves were plotted for nuclear or gas-fired generating stations.

4.1 Steam Electric Plants

Figure 4.1 shows the 1981 net station heat rates associated with coal and oil-fired steam electric generating stations in Canada. Coal-fired units ranged in size between 15 and 500 MW and oil-fired units ranged between 20 and 573 MW. Oil-fired units have had lower heat rates than similar sized coal-fired units over the range of sizes reported.

4.2 Gas Turbines

The 1980 net heat rates for gas turbines versus unit size are illustrated in Figure 4.2. Since gas turbines of similar sizes may have widely varying heat rates depending on the mode of operation of the unit, a single-valued function is not appropriate. Therefore, a range is shown for each unit size. As Figure 4.2 shows, the variation in unit size is from 5 to 68 MW. For the smaller units, heat rates range from 13 000 to 31 000 kJ/kW.h while for larger units heat rates range from 13 000 to 27 000 kJ/kW.h.


100 000
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20 000
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4 000
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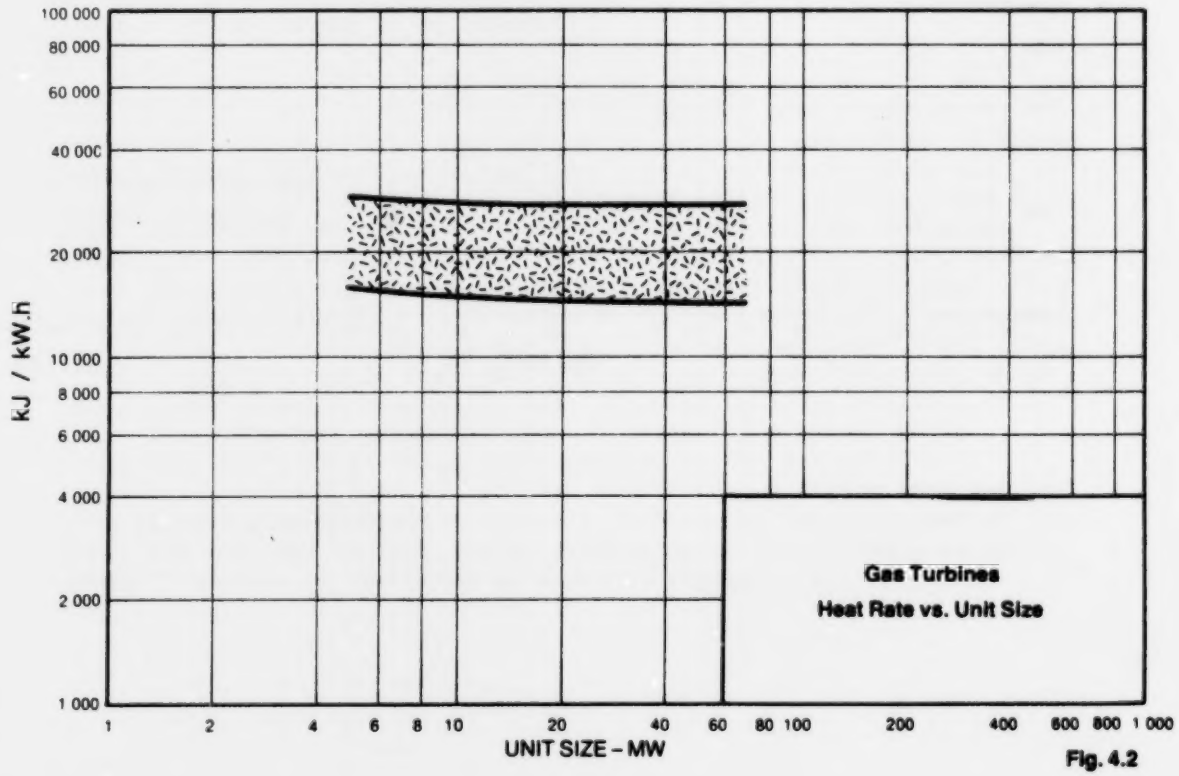
kJ / kW.h
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1 000
UNIT SIZE – MW
Steam Plants
Heat Rate vs. Unit Size
Coal-Fired
Oil-Fired

Fig. 4.1


100 000
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10 000
8 000
6 000
4 000
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1 000
kJ / kW.h
1
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4
6
8
10
20
40
60
80
100
200
400
600
800
1 000
UNIT SIZE – MW
Gas Turbines
Heat Rate vs. Unit Size

Fig. 4.2

4.3 Internal Combustion Units

Analysis of data for internal combustion units of similar sizes shows a variation in heat rates of ±32 percent about the median. The lower heat rates reflect units used more or less continuously while the higher values are representative of units used principally for standby operation. Internal combustion unit size versus heat rate relationships can be more appropriately expressed by a curve having an upper and lower bound rather than by a single-valued function. The curves are displayed graphically in Figure 4.3. The figure is based on unit sizes ranging from 30 to 6 800 kW. For the large units, the 1981 heat rates range from approximately 10 000 kJ/kW.h to 20 000 kJ/kW.h.

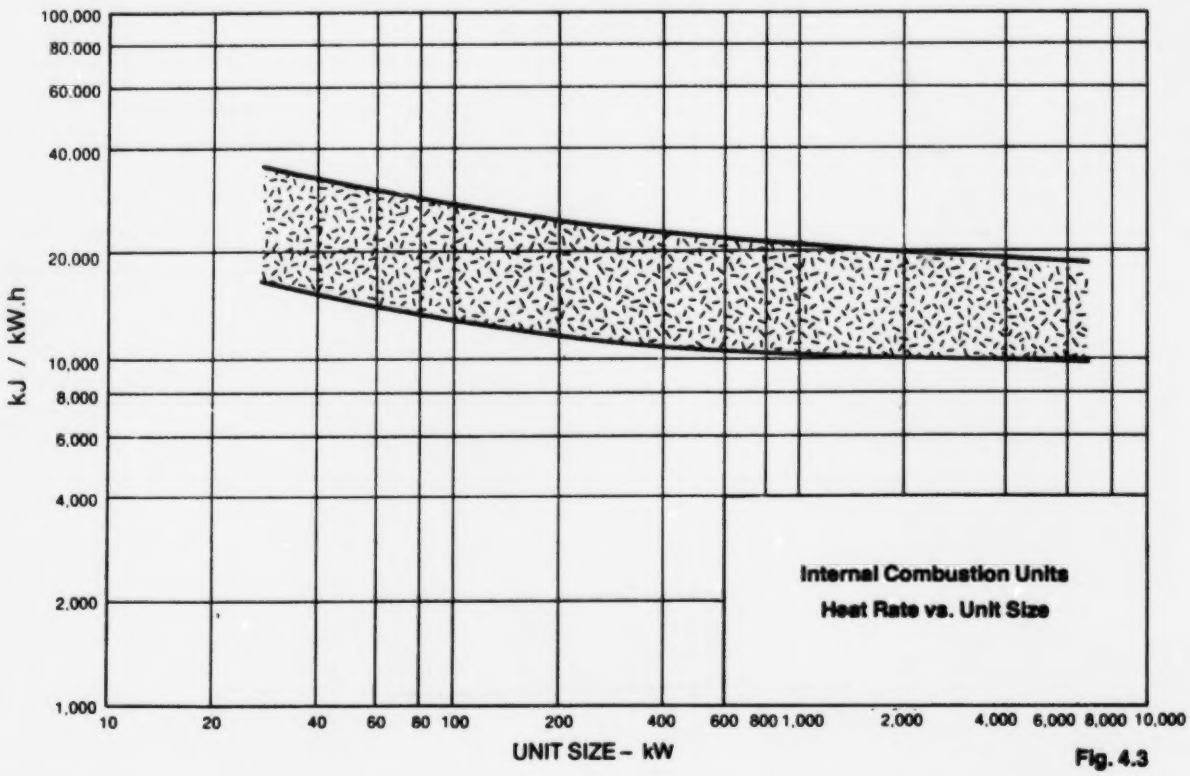


Fig. 4.3

5. CANADIAN AND PROVINCIAL TREND ANALYSIS 1977-1981

The previous sections deal with generation, fuel consumption and cost data for Canadian electrical utilities in the year 1981. This section reviews Canadian and provincial trends (including the Yukon and Northwest Territories) over the historical period, 1977 to 1981. The data are based on previous reports in this series (Ref. 2-3) except for the data on industrial self-generation and total provincial consumptions; which is based on Statistics Canada publications (Ref. 4-5). The provincial consumption includes the total provincial generation plus purchases minus sales.

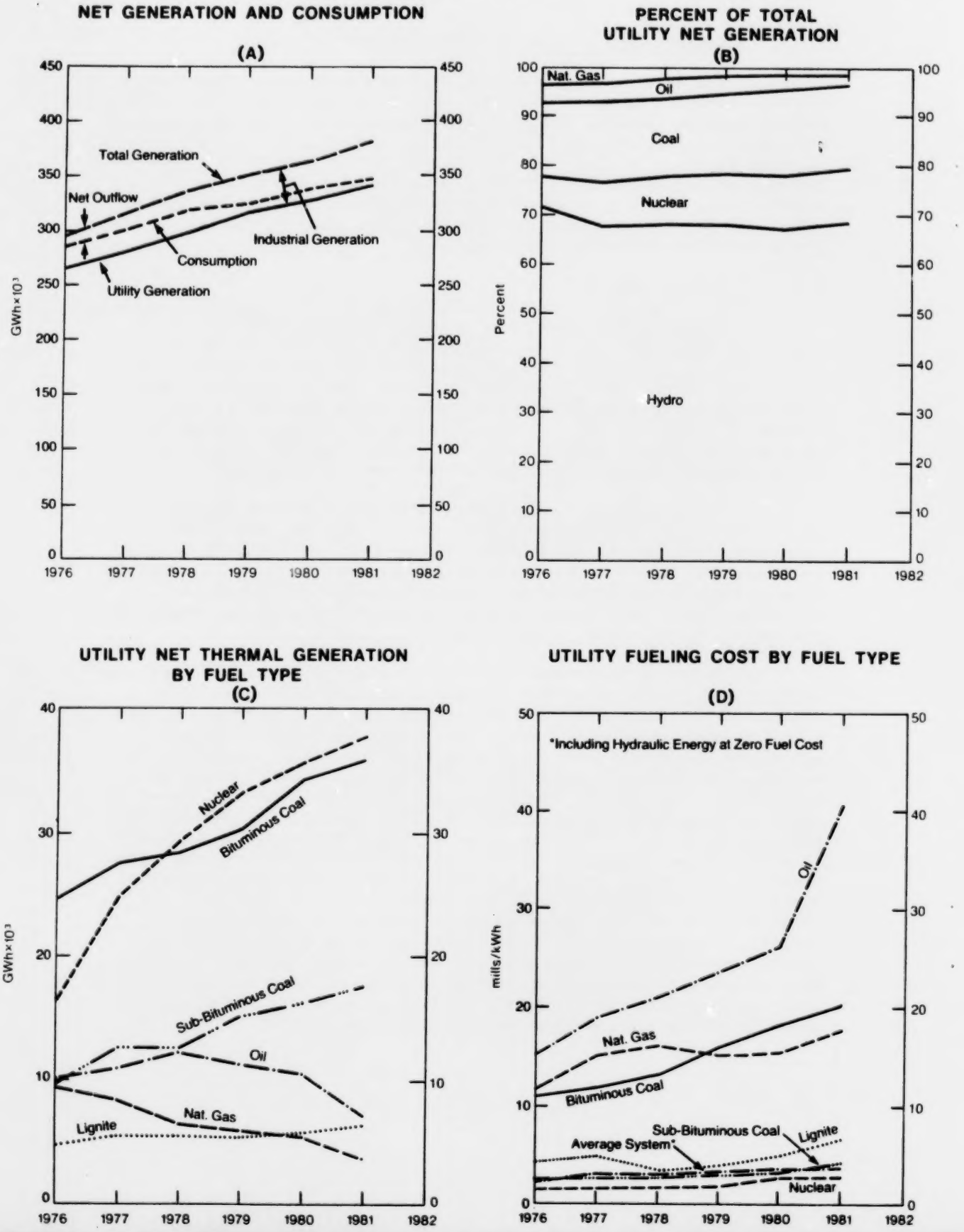
5.1 Canada (Figure 5.1)

Figure 5.1(a) shows that net generation by Canadian electrical utilities rose from 280 000 GW.h in 1977 to 340 000 GW.h in 1981. This is equivalent to an average compound rate of growth of 5.0 percent per annum. The 1981 increase however was 3.3 percent. Total consumption (total generation plus imports minus exports) is also plotted in Figure 5.1(a); it rose from 299 000 GW.h in 1977 to 346 000 GW.h in 1981. This is equivalent to an average compound growth rate of 3.7 percent per annum; the 1981 increase was 1.8 percent.

The percentage breakdown of total generation by primary energy source is indicated in Figure 5.1(b). Nuclear generation increased its share of total energy production from 9 percent in 1977 to 11 percent in 1981. The share of coal generation decreased over the same period from 20 to 18 percent while the share of natural gas decreased from 3 to 1 percent and the share of hydro did not change at the end of the period at 68 percent.

Figure 5.1(c) shows the thermal energy generated by fuel type while Figure 5.1(d) shows the corresponding fuel cost (mills/kW.h) associated with each type over the review period. Also shown in Figure 5.1(d) is the average system fuel cost trend for Canada. This was calculated by dividing the total electrical utilities' fuel costs for each year by the total generation including both thermal and hydro production. The average system fuel cost trend has been calculated and shown in the graphs for each province in the sections following. This average system fuel cost trend gives an indication of the significance of the fuel cost component to the total system generation costs. From Figure 5.1(d) it can be seen that the average system fuel cost, which was 2.7 mills/kW.h during 1977, has increased to 3.8 mills/kW.h in 1981. This increase, averaging about 9 percent per annum, while dramatic, is not as great as the increases in the prices of oil, bituminous coal and natural gas that have occurred during this period. This is understandable since hydraulic (which has been included at zero cost) and low cost nuclear energy production accounted for a total of about 79 percent of the total as shown in Figure 5.1(b).

Fig. 5.1 CANADA



5.2 Newfoundland (Figure 5.2)

As shown in Figure 5.2(a), electrical utilities' net generation in Newfoundland increased from 40 600 GW.h in 1977 to 44 200 GWh in 1981. Of this generation, 35 880 GW.h of Churchill Falls energy was sold to Quebec. This appears as an outflow in Figure 5.2(a). The equivalent annual compound rate of growth was 2.2 percent. Consumption is also plotted in Figure 5.2(a); it rose from 7 673 GW.h in 1977 to 8 800 GW.h in 1981. This is equivalent to an average annual compound growth rate of 3.5 percent; the 1981 increase was 3.5 percent.

Hydroelectric generation has made up more than 98 percent of total net generation since 1972 with the balance being supplied by oil. If net utility generation in Labrador is excluded, hydroelectric generation decreased from 88 percent in 1975 to 72 percent in 1979, then increased to 78 percent in 1980 and 90 percent in 1981. The balance of generation was oil-fired.

Excluding Labrador generation, the average system fuel cost increased from about 2.3 mills/kW.h in 1977 to 3.9 mills/kW.h in 1981.

5.3 Prince Edward Island (Figure 5.3)

Electrical utilities' total net generation in Prince Edward Island decreased from 445 GW.h in 1976 to 385 GW.h in 1977 and steadily decreased to 31 GW.h in 1981. This is because of the interconnection with New Brunswick in 1977 which allowed the import of a major portion of the Island's electrical energy requirement.

Consumption of electrical energy rose from 452 GW.h in 1977 to 511 GW.h in 1981, an annual growth of 3.1 percent. The 1981 decrease was 1.4 percent.

Generation from oil represented 100 percent of total generation during the 1977 to 1981 period.

The average system cost was 27.5 mills/kW.h in 1977 but increased considerably to 91.97 mills/kW.h in 1981 because of increases in the price of oil.

Fig. 5.2 NEWFOUNDLAND

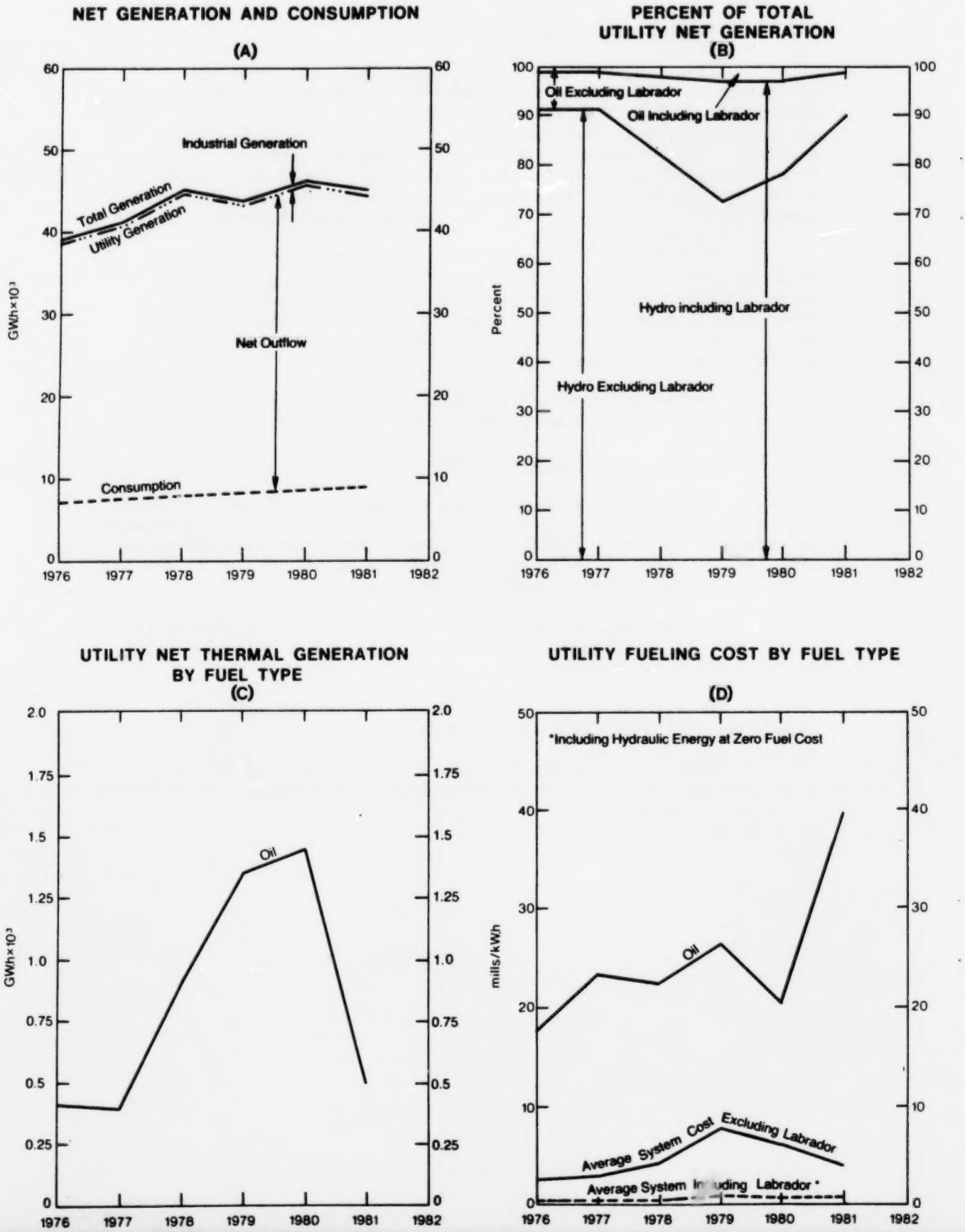
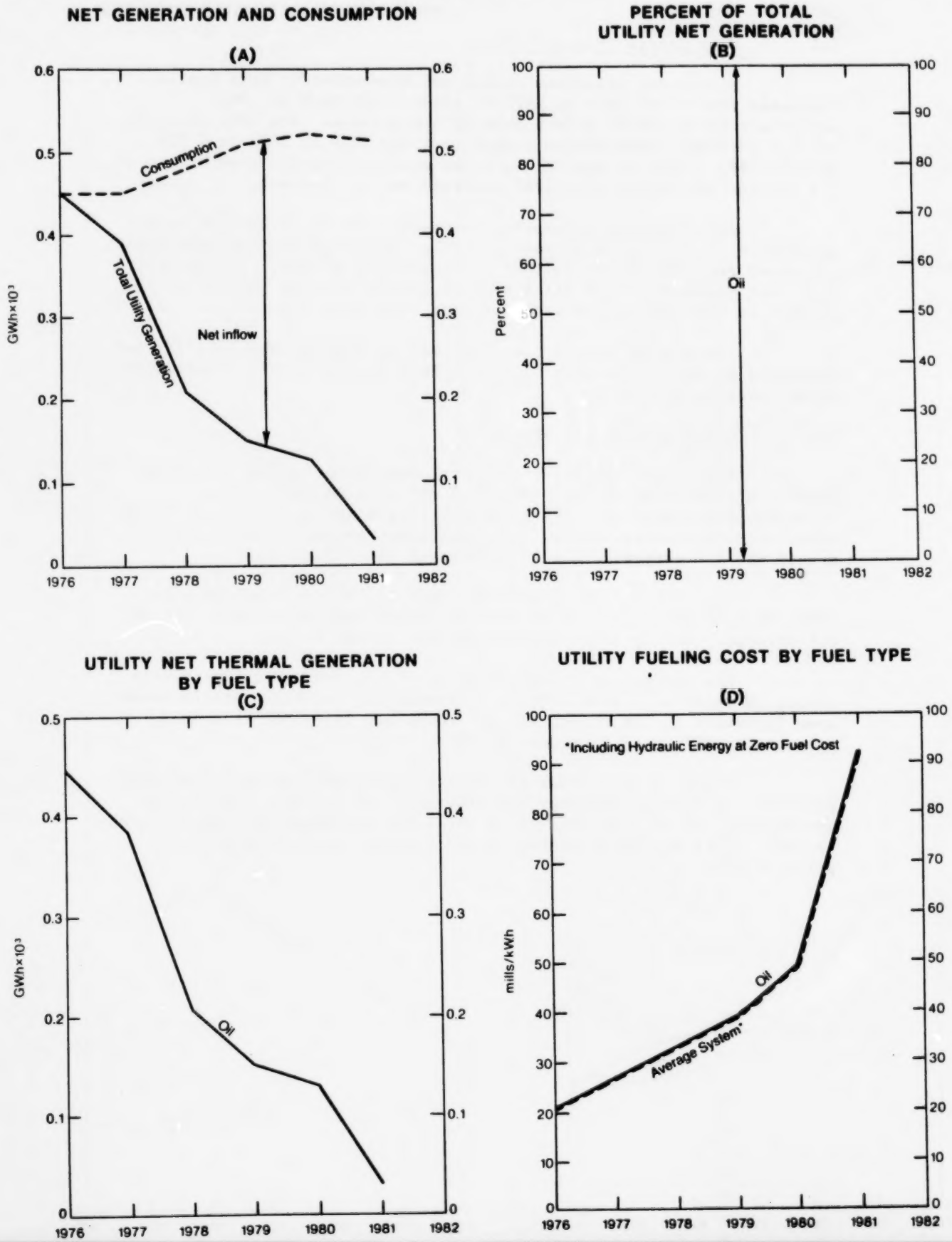


Fig. 5.3 PRINCE EDWARD ISLAND



5.4 Nova Scotia (Figure 5.4)

Electrical utilities' total net generation in Nova Scotia increased from 5 300 GW.h in 1977 to about 6 100 GW.h in 1981, equivalent to an annual growth rate of 3.6 percent. The 1981 decrease was 4.7 percent. Consumption rose from 6 100 GW.h in 1977 to 6 800 GW.h in 1981. This is equivalent to an average compound growth rate of 2.8 percent per annum; the 1981 decrease was 0.7 percent.

Hydroelectric generation increased from 14 percent of total generation in 1977 to 18 percent in 1981. Energy generation from coal increased from 18 percent in 1977 to 43 percent in 1981. On the other hand, net generation from oil decreased from 67 percent in 1977 to 39 percent in 1981 reflecting a significant trend away from oil to coal.

The average system fuel cost was 14.0 mills/kW.h in 1977, but increased to 20.3 mills/kW.h in 1981. This was due to the significant price increase of oil.

5.5 New Brunswick (Figure 5.5)

Electrical utilities total net generation in New Brunswick increased from 7 600 GW.h in 1977 to 8 300 GW.h in 1981. This increase, which started in 1976, is attributed mainly to the increased exports to the United States. The equivalent annual compound rate of growth was 2.2 percent; the 1981 decrease was 3.5 per cent.

Consumption rose from 8 000 GW.h in 1977 to 8 800 GW.h in 1981. This is equivalent to an average annual compound growth rate of 2.4 percent. During 1981 the increase was insignificant.

The percentage breakdown of total net generation by primary source is shown in Figure 5.5(b). Although oil has historically shown some increases in its share, the oil share has decreased from 56.2 percent in 1977 to 40.3 percent in 1981.

Figure 5.5(c) shows the energy generated from each fuel type, while Figure 5.5(d) shows the corresponding fuel costs. The average system cost was 10.5 mills/kW.h in 1977, but increased to 17.9 mills/kW.h in 1981. This was attributable to the significant increases in the price of oil.

Fig. 5.4 NOVA SCOTIA

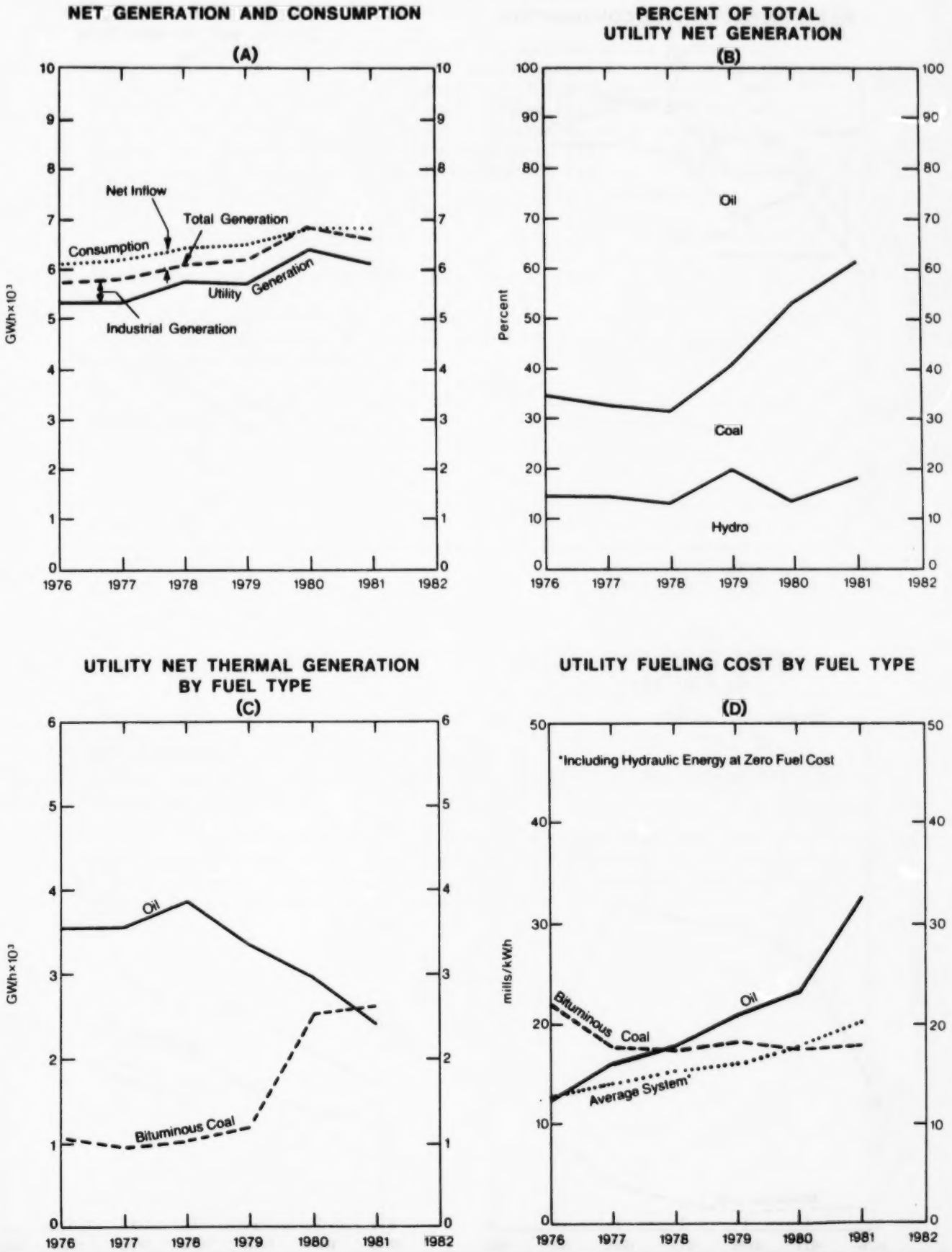
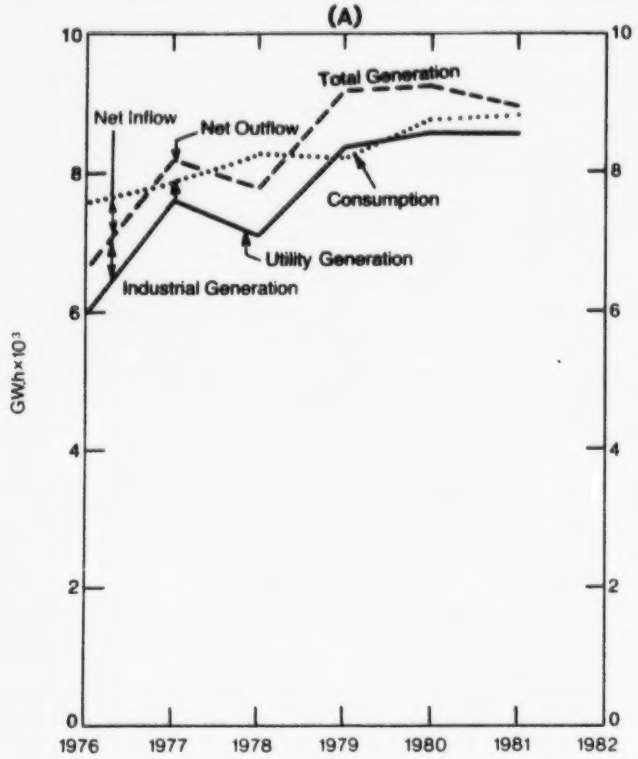


Fig. 5.5 NEW BRUNSWICK

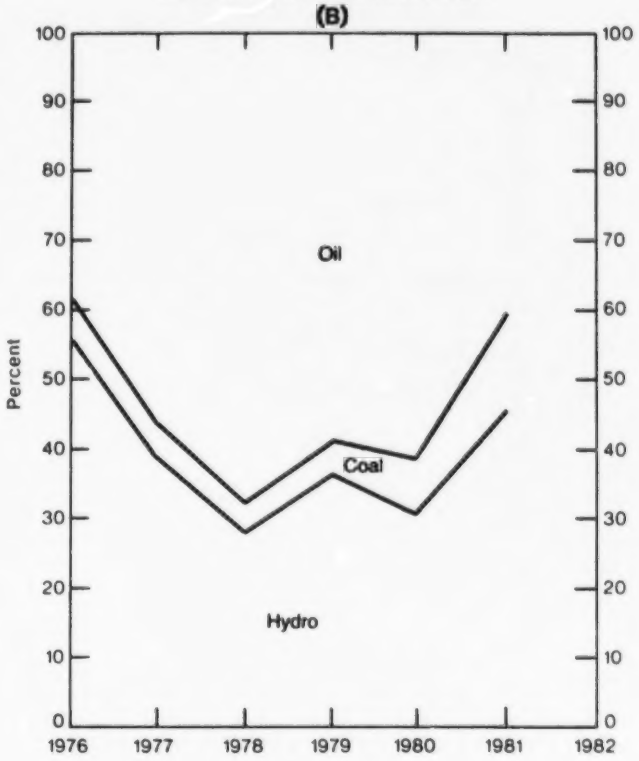
NET GENERATION AND CONSUMPTION

(A)



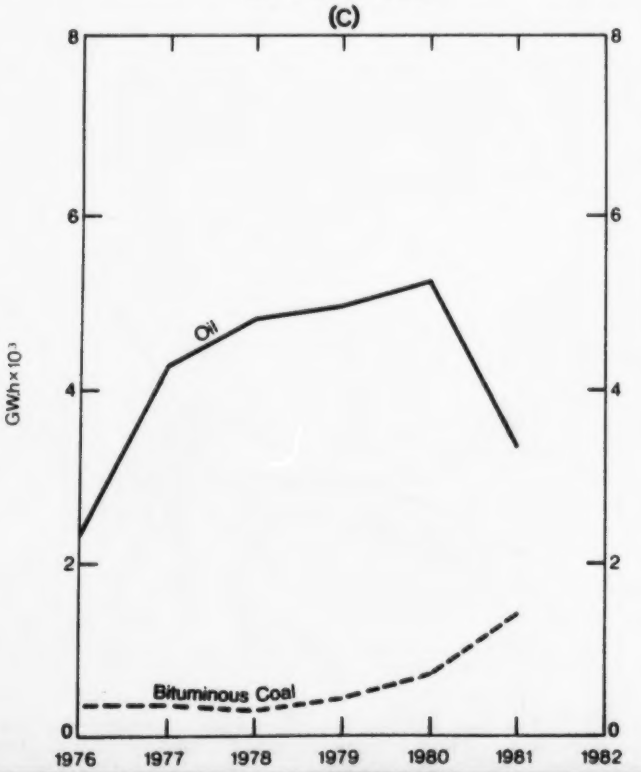
PERCENT OF TOTAL UTILITY NET GENERATION

(B)



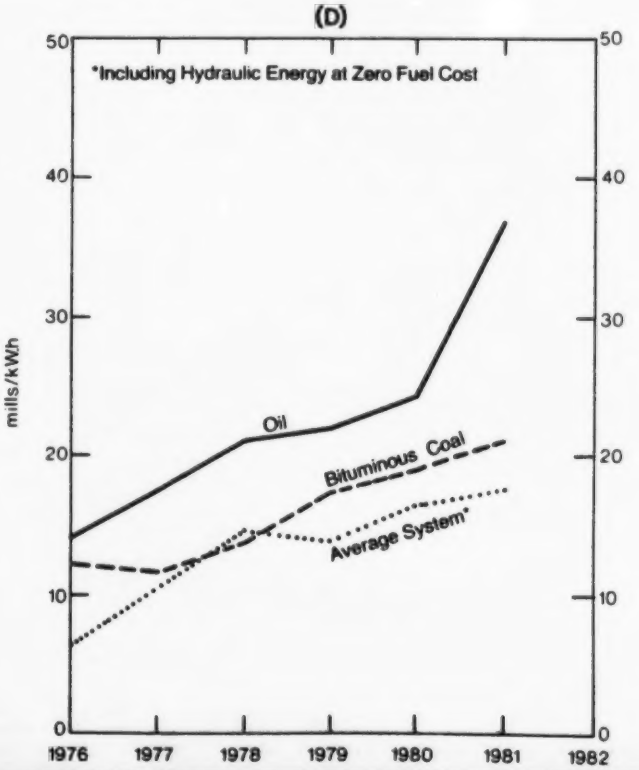
UTILITY NET THERMAL GENERATION BY FUEL TYPE

(C)



UTILITY FUELING COST BY FUEL TYPE

(D)



5.6 Quebec (Figure 5.6)

Electrical utilities' total net generation in Quebec increased from about 64 600 GW.h in 1977 to about 85 000 GW.h in 1981, equivalent to an annual rate of growth of 7.1 percent. During 1981 there was an increase of 5.3 percent. These figures do not include imports from Labrador. If Labrador is included, these generation figures would be approximately 98 000 GW.h in 1977 and 120 800 GW.h in 1981, which is equivalent to an annual growth rate of 5.4 percent over the period 1977 to 1981.

Consumption rose from 101 600 GW.h in 1977 to 120 700 GW.h in 1981. This is equivalent to an average compound growth rate of 4.4 percent per annum; during 1981 there was an increase of 2.0 percent.

Hydroelectric generation accounted for more than 99 percent of total net generation during the period 1977 to 1981. The balance was generated by oil-fired plants.

The average system fuel cost was negligible over the whole period due to the preponderance of hydroelectric generation.

5.7 Ontario (Figure 5.7)

The electrical utilities' net generation in Ontario increased from 91 500 GW.h in 1977 to 106 600 GW.h by 1981; the equivalent annual compound rate of growth during the period was 3.9 percent. Consumption rose from 98 400 GW.h in 1977 to 107 700 GW.h in 1981. This is an average compound growth rate of 2.3 percent per annum; the 1981 increase was 1.1 percent.

The percentage breakdown of total net generation by primary source is indicated in Figure 5.7(b). It shows that whereas in 1977 hydro generation accounted for 52 percent of the total, in 1981 it accounted for only 34 percent. Over the same period nuclear generation increased from 27 to 36 percent of the total, while coal remained relatively constant at about 30 percent of the total. The use of oil and natural gas decreased steadily over the 1977 to 1981 period and was negligible in 1981.

Figure 5.7(c) shows the energy generated from each fuel type, while Figure 5.7(d) shows the corresponding mills/kW.h cost. Figure 5.7(d) shows that the average system fuel cost increased from about 4.9 mills/kW.h in 1977 to 7.3 mills/kW.h in 1981.

Fig. 5.6 QUEBEC

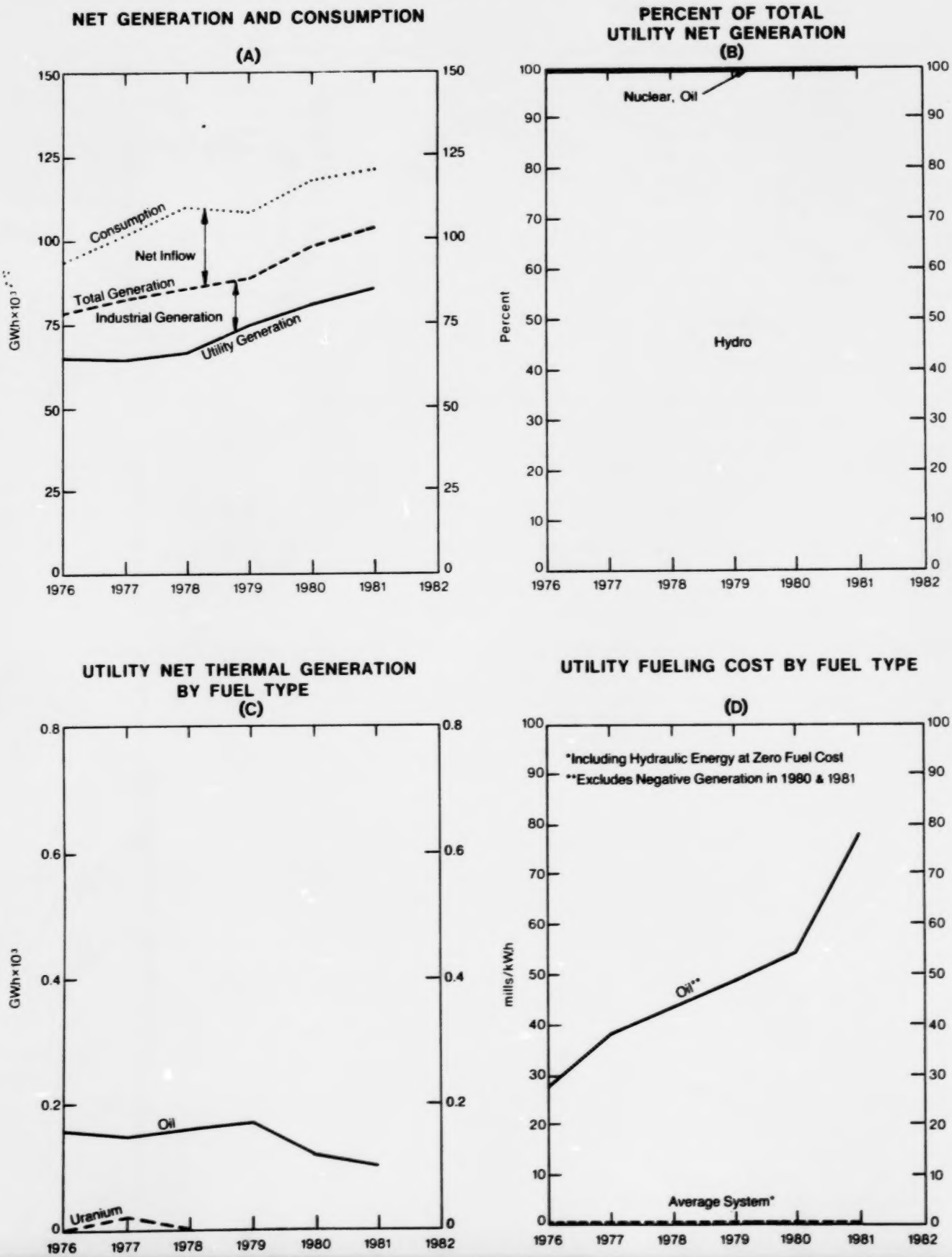
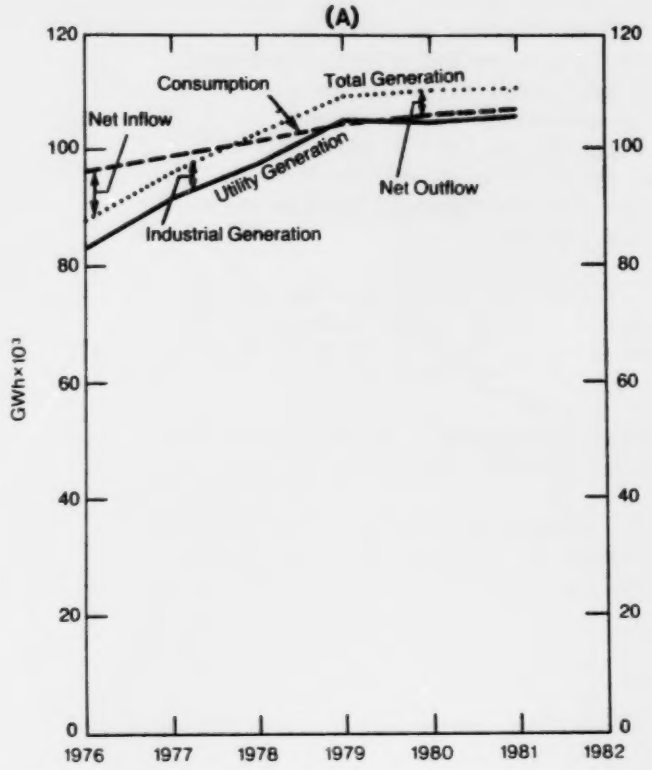
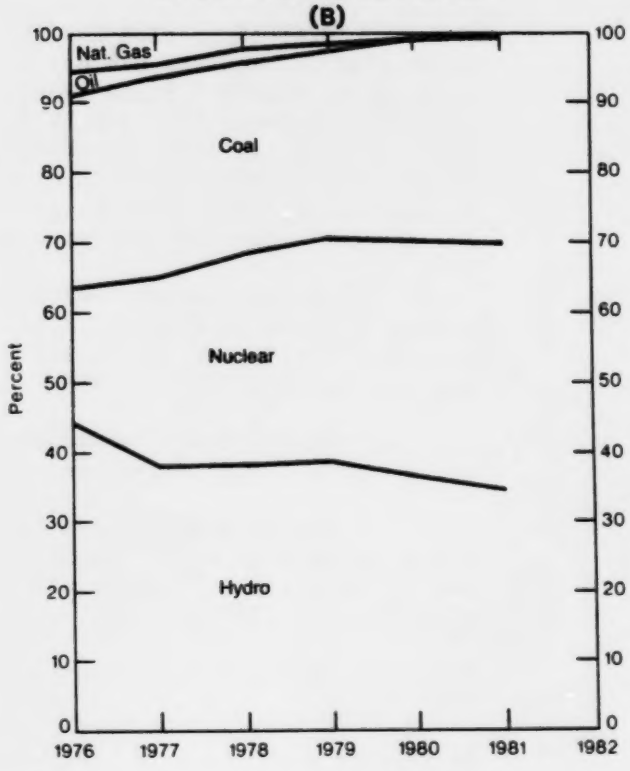


Fig. 5.7 ONTARIO

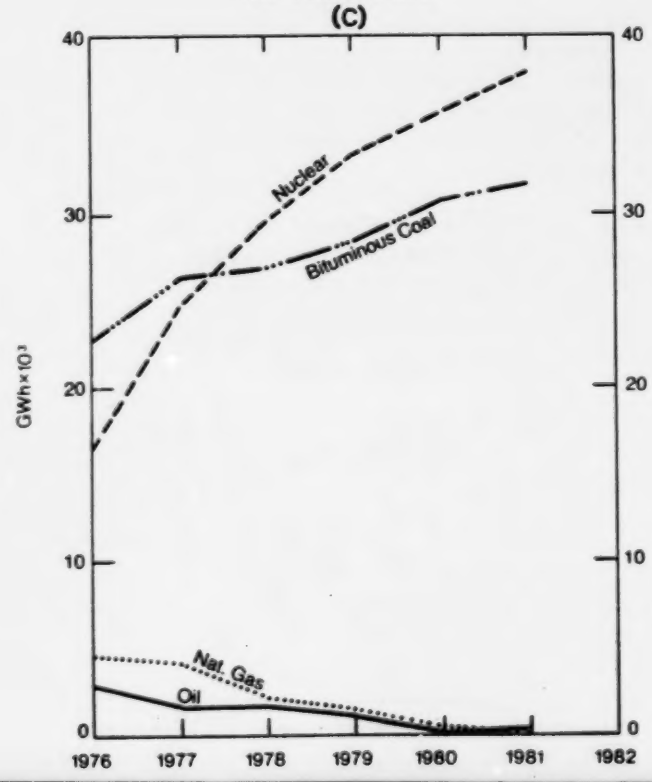
NET GENERATION AND CONSUMPTION



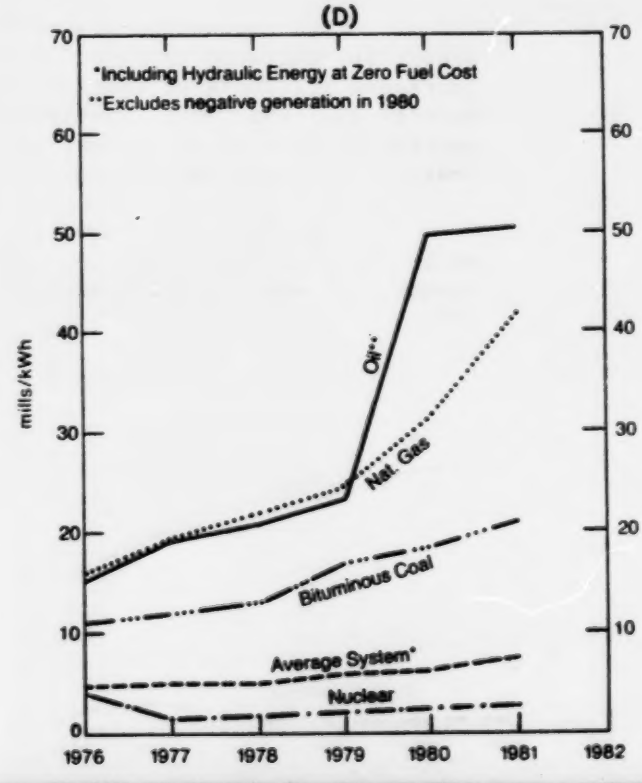
PERCENT OF TOTAL UTILITY NET GENERATION



UTILITY NET THERMAL GENERATION BY FUEL TYPE



UTILITY FUELING COST BY FUEL TYPE



5.8 Manitoba (Figure 5.8)

Over the period 1977 to 1981, electrical utility net generation in Manitoba has not followed a consistent growth pattern. As shown in Figure 5.8(a), generation decreased slightly between 1976 and 1977. Between 1977 and 1979 it increased by 28.4 percent to 20 500 GW.h. However, in 1980 it decreased slightly to 19 400 GW.h and to 18 300 GW.h in 1981. Consumption has grown from 12 400 GW.h in 1977 to 13 500 GW.h in 1981. This is an average annual compound growth rate of 2.1 percent; the 1981 decrease was 3.2 percent.

The percentage breakdown of total net generation by primary source is shown in Figure 5.8(b). Hydroelectric energy generation accounted for 90 percent in 1977, increased to 99.7 percent in 1979, and decreased to 97.9 in 1981.

Figure 5.8(c) shows the energy generated from each fuel type while Figure 5.8(d) shows the corresponding fuel costs.

Figure 5.8(d) shows that the average system fuel cost was 1.4 mills/kW.h in 1977. In 1978, however, it dropped with decreased use of coal; the 1979 value was 0.2 mills/kW.h, increasing to 0.4 mills/kW.h in 1980 and 1981.

5.9 Saskatchewan (Figure 5.9)

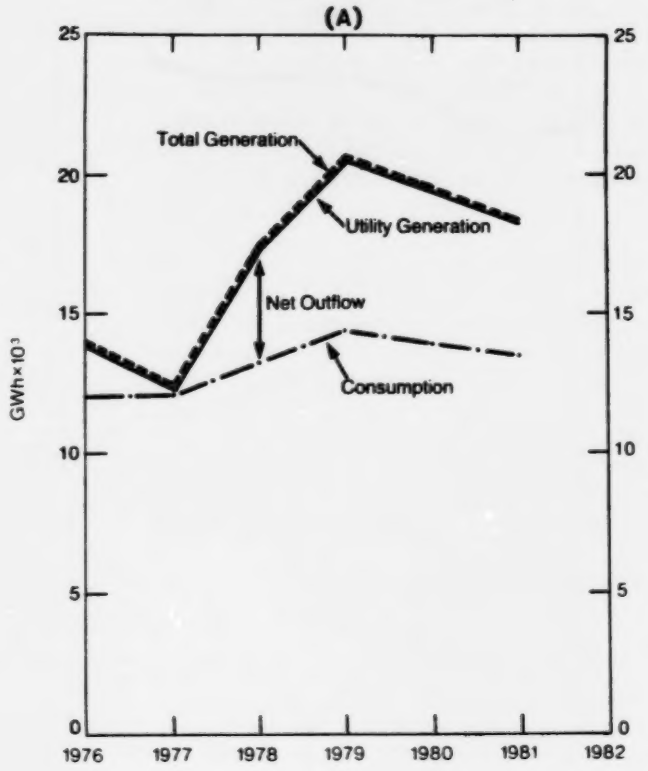
Electrical utilities' net generation increased from 8 100 GW.h in 1977 to 9 300 GW.h in 1981, which is an annual rate of growth of 3.5 percent. The 1981 growth was 5.7 percent. Consumption rose from 8 100 GW.h in 1977 to 9 900 GW.h in 1981. This is equivalent to an average annual compound growth rate of 5.1 percent; the 1981 increase was 1.0 percent.

The percentage breakdown of total net generation by primary source is indicated in Figure 5.9(b). Hydroelectric generation increased its share of total energy production from 25 to 32 percent between 1977 and 1981. Energy generation from coal increased from 62 percent in 1977 to 63 percent in 1981, while natural gas decreased its share in the same period from 13 to 4 percent.

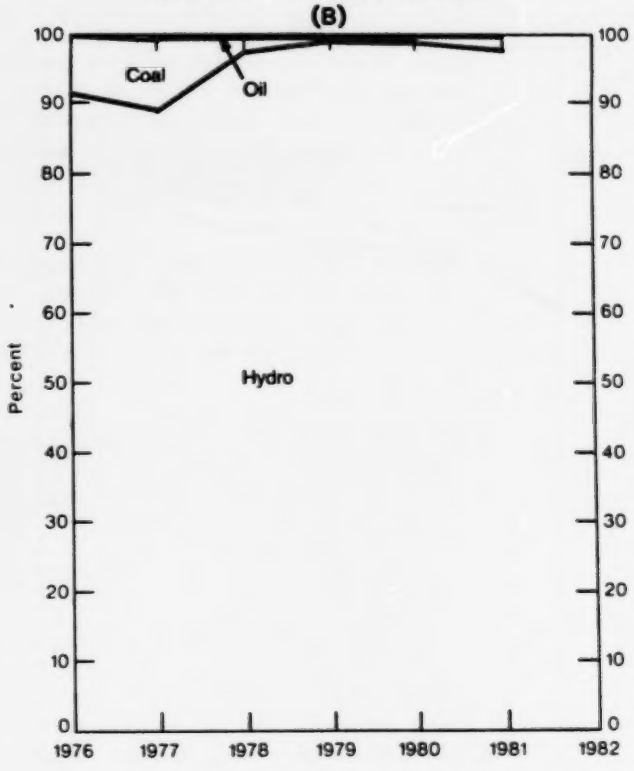
Figure 5.9(c) shows the energy generated from each fuel type while Figure 5.9(d) shows the corresponding fuel costs. The average system cost was 4.8 mills/kW.h in 1977 increasing to 5.7 mills/KW.h in 1981.

Fig. 5.8 MANITOBA

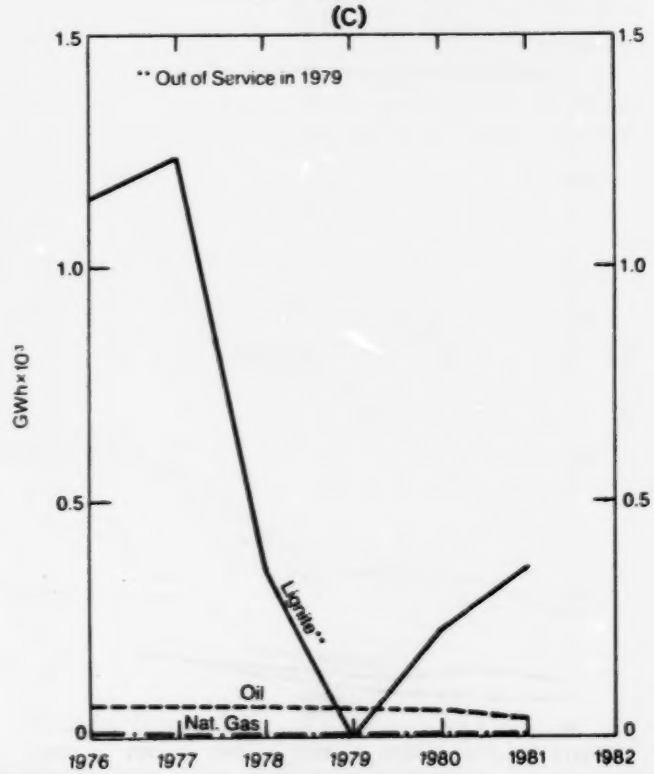
NET GENERATION AND CONSUMPTION



PERCENT OF TOTAL UTILITY NET GENERATION



UTILITY NET THERMAL GENERATION BY FUEL TYPE



UTILITY FUELING COST BY FUEL TYPE

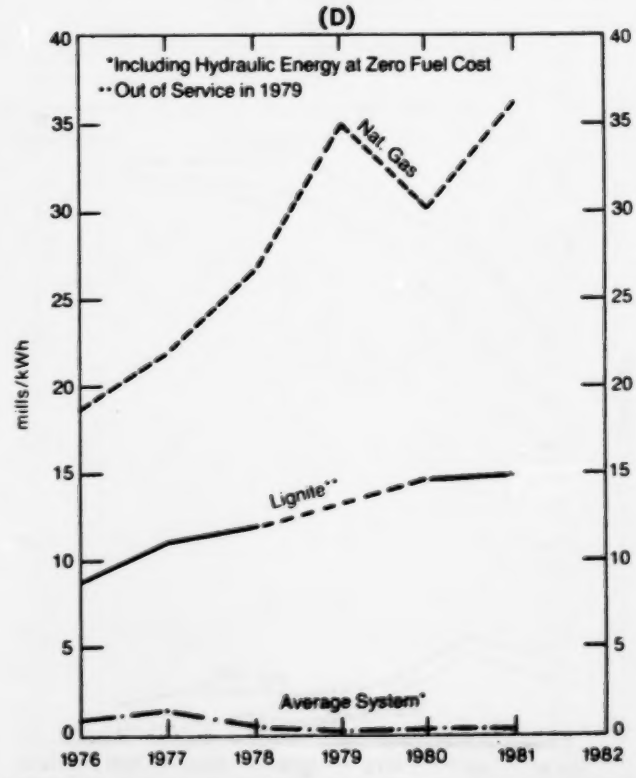
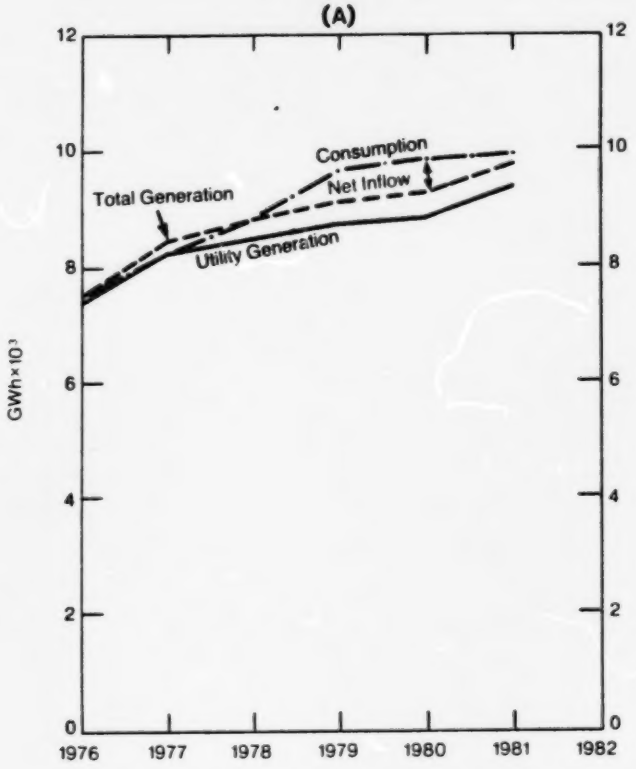


Fig. 5.9 SASKATCHEWAN

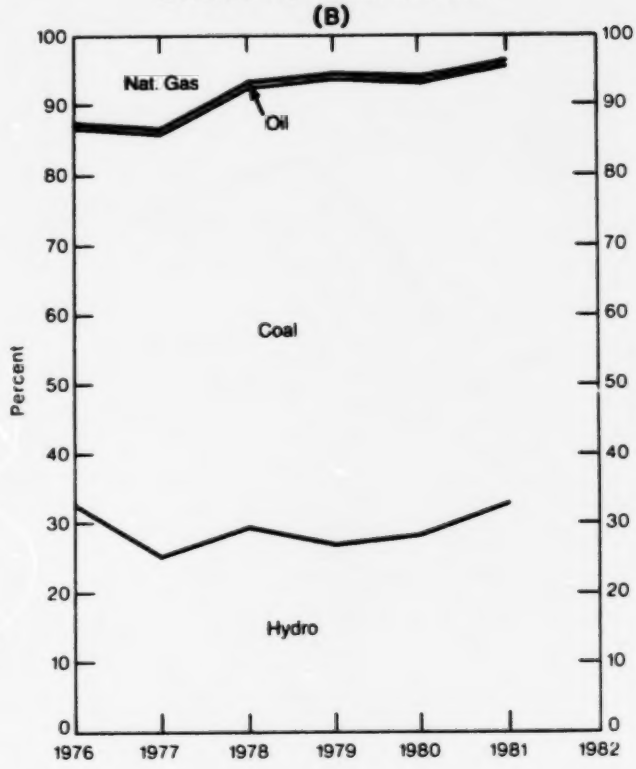
NET GENERATION AND CONSUMPTION

(A)



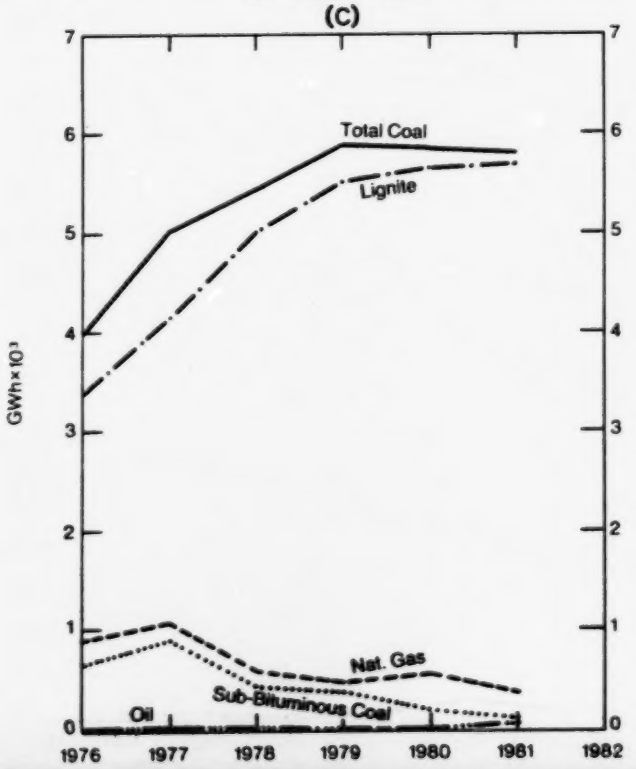
PERCENT OF TOTAL UTILITY NET GENERATION

(B)



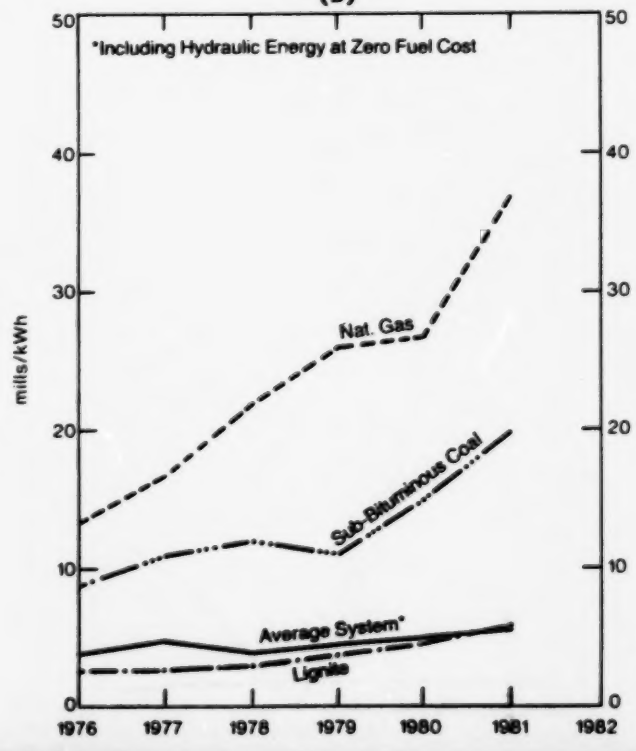
UTILITY NET THERMAL GENERATION BY FUEL TYPE

(C)



UTILITY FUELING COST BY FUEL TYPE

(D)



5.10 Alberta (Figure 5.10)

Electrical utilities' net generation increased steadily from 17 000 GW.h in 1977 to 23 000 GW.h in 1981, which is equivalent to an annual rate of growth of 7.8 percent. Consumption rose from 17 500 GW.h in 1977 to 25 500 GW.h in 1981. This is an average annual compound growth rate of 9.9 percent; the 1981 increase was 9.9 percent.

The percentage breakdown of total net generation by primary source is indicated in Figure 5.10(b). During the period between 1977 and 1981, coal-fired generation increased its share from 72 to 77 percent. The share of gas-fired generation fell from 20 percent in 1977 to 14 percent in 1981.

Figure 5.10(c) shows the energy generated from each fuel type while Figure 5.10(d) shows the corresponding fuel cost. The average system fuel cost increased from 3.3 mills/kW.h in 1977 to 5.4 mills/kW.h in 1981.

5.11 British Columbia (Figure 5.11)

Electrical utilities' net generation in British Columbia increased from 31 500 GW.h in 1977 to 38 800 GW.h in 1981; the equivalent annual compound rate of growth was 5.3 percent. The 1981 increase was 27.2 percent. Consumption rose from 38 400 GW.h in 1977 to 43 300 GW.h in 1981. This is an average annual compound growth rate of 3.0 percent; the 1981 increase was 1.2 percent.

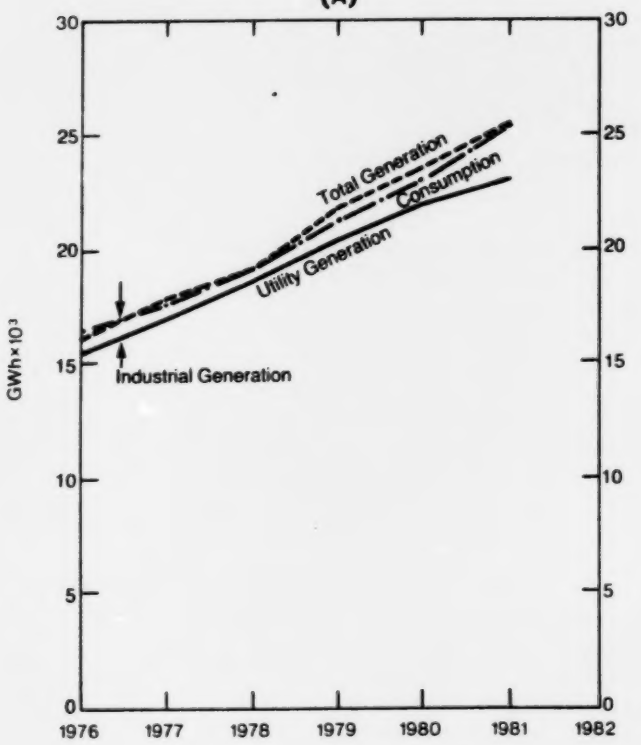
The percentage breakdown of total net generation by primary source is indicated in Figure 5.11(b). Hydroelectric generation accounted for more than 97 percent of the total in all years.

Figure 5.11(c) shows the energy generated from each fuel type, while Figure 5.11(d) shows the corresponding fuel cost. The average system fuel costs were negligible over the whole period due to the preponderance of hydroelectric generation.

Fig. 5.10 ALBERTA

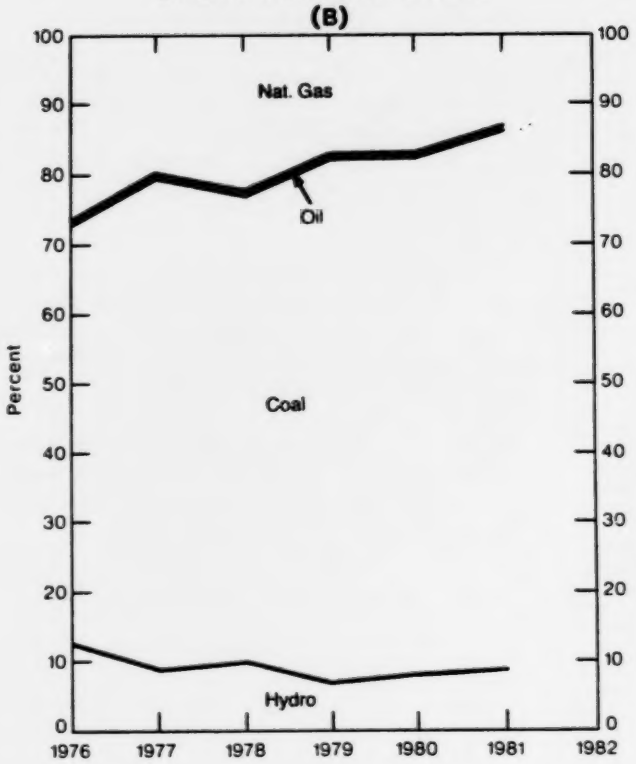
NET GENERATION AND CONSUMPTION

(A)



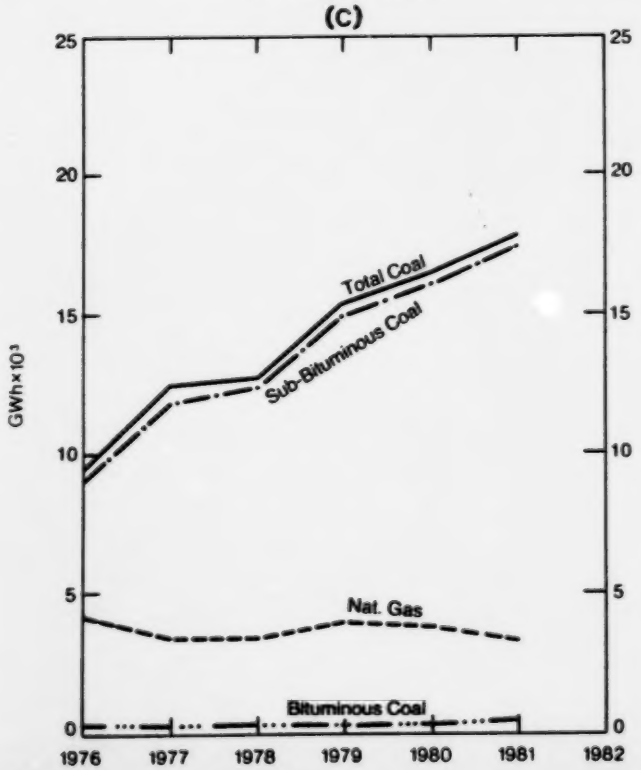
PERCENT OF TOTAL UTILITY NET GENERATION

(B)



UTILITY NET THERMAL GENERATION BY FUEL TYPE

(C)



UTILITY FUELING COST BY FUEL TYPE

(D)

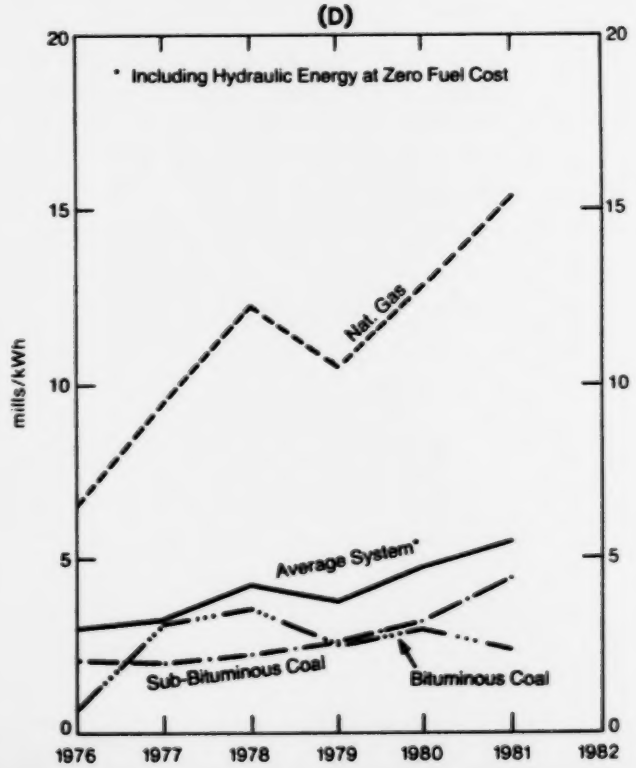
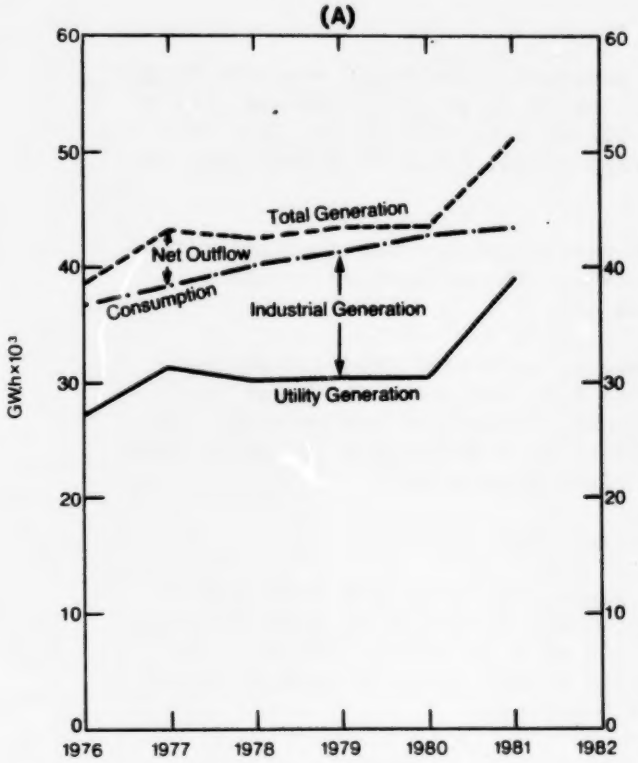


Fig. 5.11 BRITISH COLUMBIA

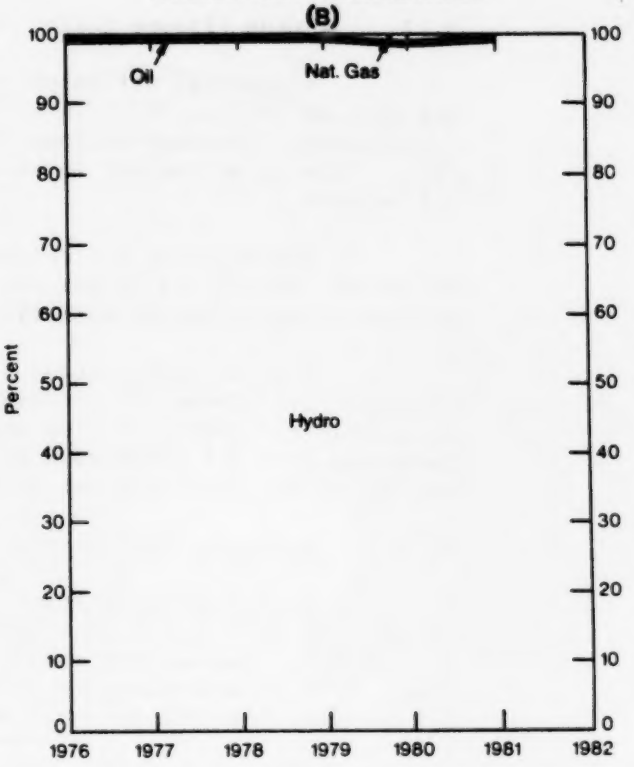
NET GENERATION AND CONSUMPTION

(A)



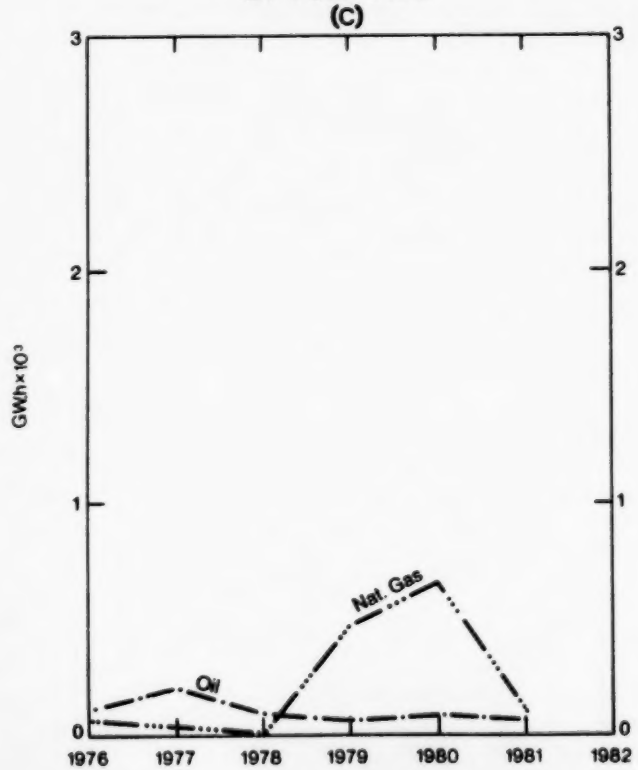
PERCENT OF TOTAL UTILITY NET GENERATION

(B)



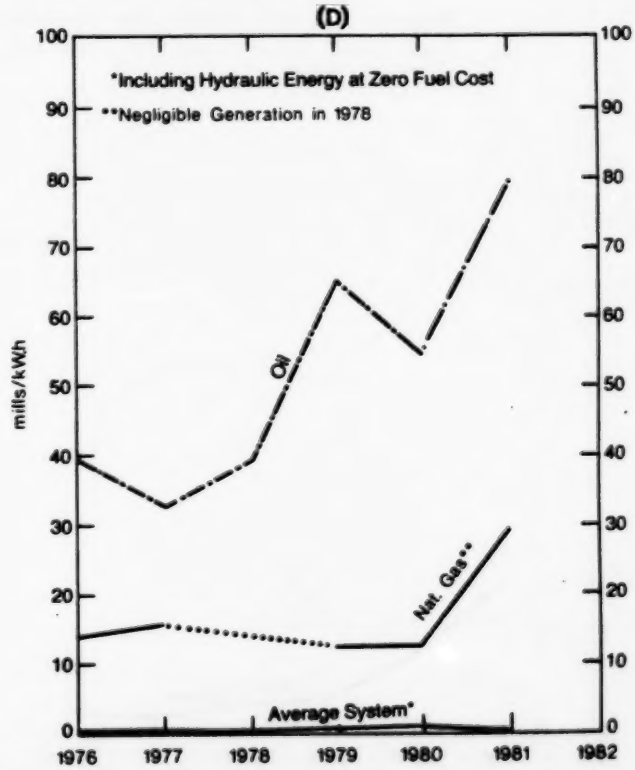
UTILITY NET THERMAL GENERATION BY FUEL TYPE

(C)



UTILITY FUELING COST BY FUEL TYPE

(D)



5.12 Yukon (Figure 5.12)

Electrical utilities' net generation increased steadily from 341 GW.h in 1977 to 385 GW.h in 1981, which is an annual growth rate of 3.1 percent. Consumption rose from 367 GW.h in 1977 to 385 GW.h in 1981. This is equivalent to an average annual compound growth rate of 1.2 percent.

The share of hydroelectric generation decreased steadily from 95 percent in 1977 to 75 percent in 1981. The balance of energy generation was produced entirely from oil.

Figure 5.12(c) shows the energy generated from oil while Figure 5.12(d) shows the corresponding fuel oil cost, which was 86.3 mills/kW.h for 1981. It also shows that the average system cost increased from 2.6 mills/kW.h in 1977 to 21.3 mills/kW.h in 1981. This was due to the increased use of oil fired generation.

5.13 Northwest Territories (Figure 5.13)

Electrical utilities' net generation increased from about 406 GW.h in 1977 to 471 GW.h in 1981, which is an annual growth rate of 3.8 percent. Consumption rose from 455 GW.h in 1977 to 502 GW.h in 1981. This is equivalent to an average annual compound growth rate of 2.5 percent; the 1981 increase was 1.6 percent.

The percentage breakdown of total net generation by primary energy source is shown in Figure 5.13(b). The share of hydroelectric generation decreased from 61 percent in 1977 to 49 percent in 1981.

Figure 5.13(c) shows the energy generated from oil while Figure 5.13(d) shows the corresponding fuel costs. The average system fuel cost rose steadily from 15.9 to 34.7 mills/kW.h over the period 1977 to 1981.

Fig. 5.12 YUKON

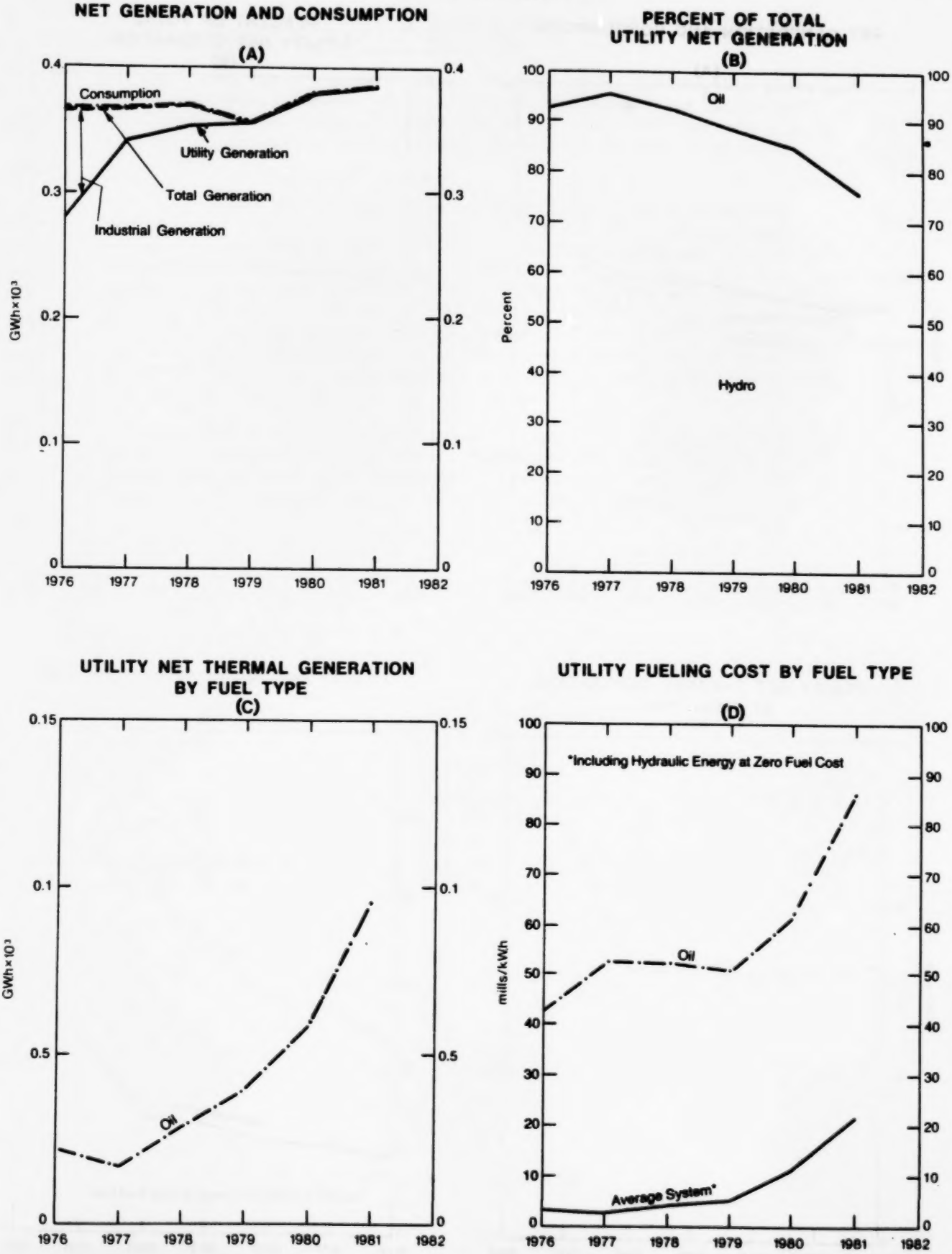
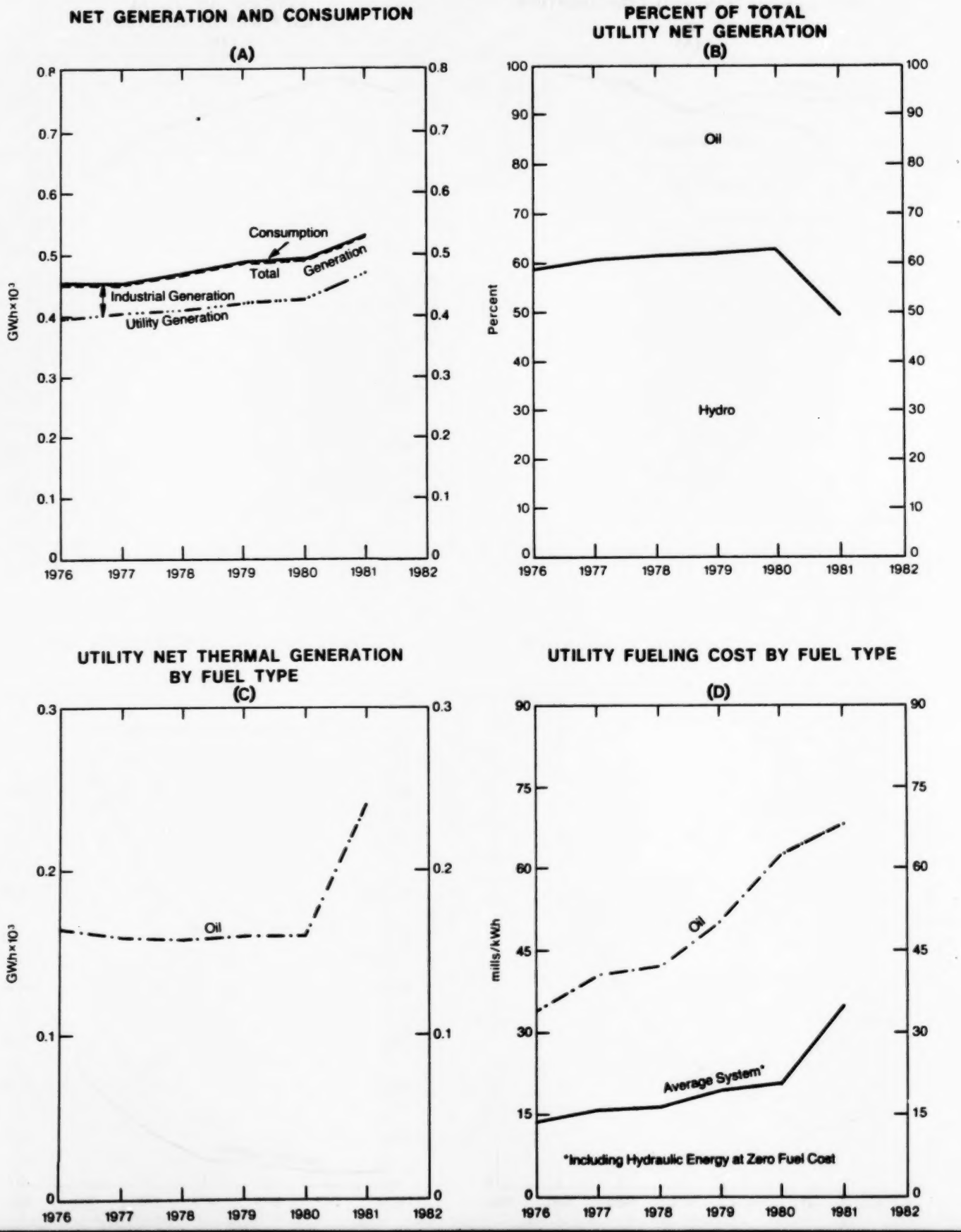


Fig. 5.13 NORTHWEST TERRITORIES



6. CANADIAN POPULATION, GROSS NATIONAL PRODUCT AND ELECTRICITY GENERATION TRENDS - 1961 - 1981

The Board has noted other studies which indicate that there is a relationship between electric energy consumption per capita and real Gross National Product (GNP) per capita (Ref. 10). Accordingly, as a matter of interest, there follows an analysis of this relationship for Canada.

Table 6.1 provides data on electrical energy consumption, real GNP and population over the period 1961 to 1981. The average annual compound growth rates are about 6.8 percent, 5.5 percent and 1.7 percent respectively for the period 1961 to 1970 inclusive and 4.9 percent, 3.6 percent, and 1.2 percent respectively for the period 1971 to 1981. (Refs. 5, 6, 8 and 9). Figure 6.1 illustrates the correlation between per capita electricity consumption and per capita real GNP. The uncertainty surrounding the economic recessionary period since 1979 and energy prices has resulted in a deviation of this relationship from the straight line trend.

Table 6.2 provides data on the behaviour of the real price of electricty between 1970 and 1981. The long-term trend exhibits a steady decline until 1974 after which increases occurred until 1977, a levelling off and then falling in 1981. (Ref. 5 and 9).

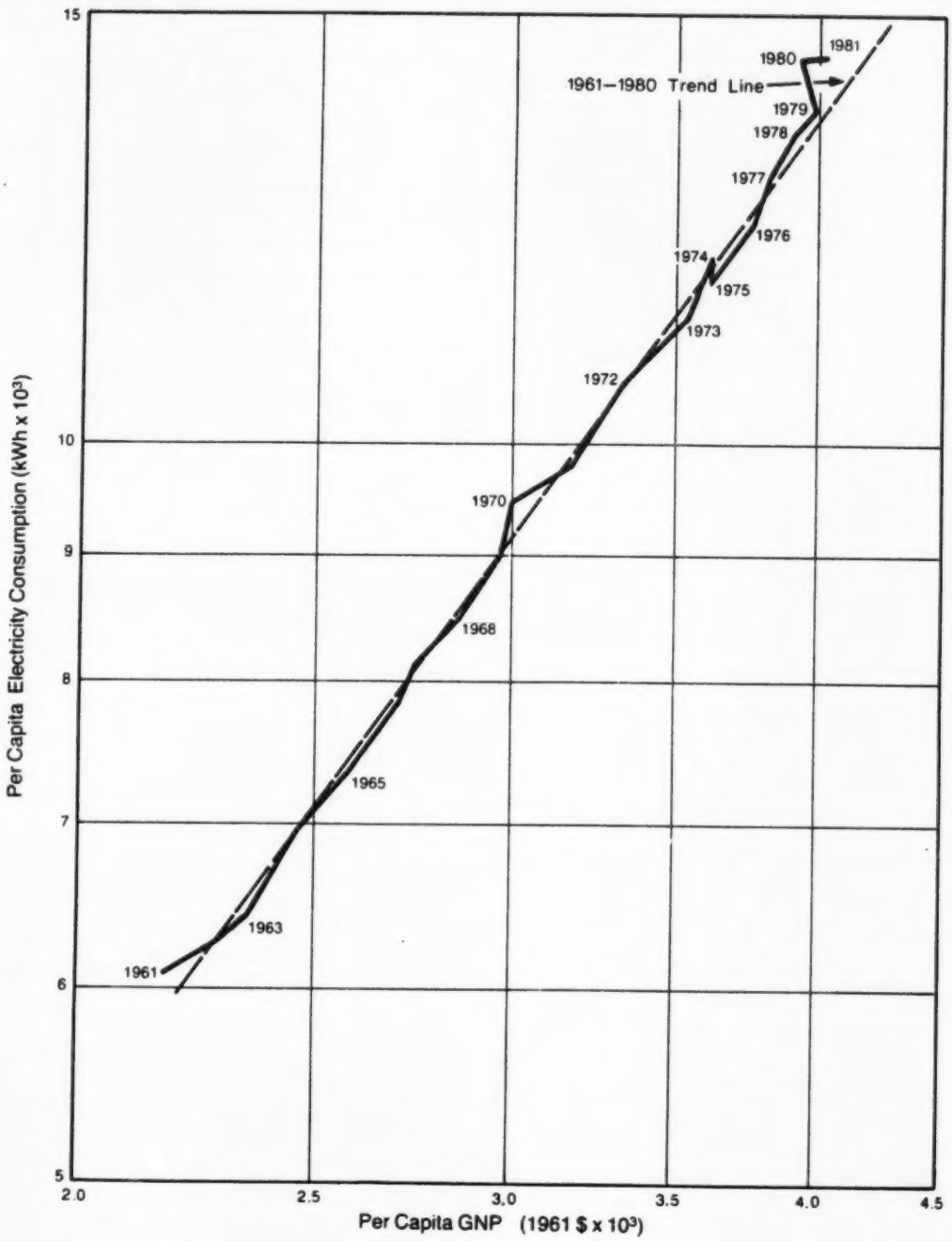


Fig. 6.1 *Per Capita Electricity Consumption vs. per Capita GNP*

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TABLE 1.1

ELECTRIC UTILITIES

PROVINCIAL INSTALLED CAPACITY AND GENERATION

BY PRIMARY ENERGY SOURCE

1981

PROVINCE OR TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GWH	MW	GWH	MW	GWH	MW	GWH
NEWFOUNDLAND	696.8	512.0	.0	.0	6130.1	43686.6	6826.9	44198.6
PRINCE EDWARD ISLAND	118.2	30.8	.0	.0	.0	.0	118.2	30.8
NOVA SCOTIA	1587.5	5015.1	.0	.0	354.9	1127.0	1942.4	6142.0
NEW BRUNSWICK	1759.1	4480.7	.0	.0	883.5	3786.6	2642.6	8267.2
QUEBEC	1054.2	101.4	266.4	.0	18190.6	84852.4	19511.2	84953.8
ONTARIO	12756.7	32273.9	5600.0	37799.0	6764.4	36504.3	25121.1	106577.3
MANITOBA	455.7	392.7	.0	.0	3641.1	17899.1	4096.8	18291.7
SASKATCHEWAN	1691.1	6242.1	.0	.0	552.9	3015.0	2244.0	9257.1
ALBERTA	5055.8	21003.7	.0	.0	733.7	2035.4	5789.5	23039.1
BRITISH COLUMBIA	1322.6	147.8	.0	.0	7545.7	38614.7	8868.3	38762.5
YUKON	35.1	95.1	.0	.0	58.1	290.0	93.2	385.2
NORTHWEST TERRITORIES	111.1	240.1	.0	.0	44.0	230.6	155.1	470.7
CANADA	26644.0	70535.3	5866.4	37799.0	44899.0	232041.5	77409.4	340375.9

NOTE:

1. FOR BREAKDOWN OF FOSSIL FUELLED, SEE TABLES 1.4(A), 1.4(B), AND 1.4.

TABLE 1.2

ELECTRIC UTILITIES

PPOVINCIAL INSTALLED CAPACITY AND GENERATION

BY PRIMARY ENERGY SOURCE

PERCENT OF CANADIAN TOTALS

1981

PROVINCE OR TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GWH	MW	GWH	MW	GWH	MW	GWH
NEWFOUNDLAND	2.6	.7	.0	.0	13.7	18.8	8.8	13.0
PRINCE EDWARD ISLAND	.4	.0	.0	.0	.0	.0	.2	.0
NOVA SCOTIA	6.0	7.1	.0	.0	.8	.5	2.5	1.8
NEW BRUNSWICK	6.6	6.4	.0	.0	2.0	1.6	3.4	2.4
QUEBEC	4.0	.1	4.5	.0	40.5	36.6	25.2	25.0
ONTARIO	47.9	45.8	95.5	100.0	15.1	15.7	32.5	31.3
MANITOBA	1.7	.6	.0	.0	8.1	7.7	5.3	5.4
SASKATCHEWAN	6.3	8.8	.0	.0	1.2	1.3	2.9	2.7
ALBERTA	19.0	29.8	.0	.0	1.6	.9	7.5	6.8
BRITISH COLUMBIA	5.0	.2	.0	.0	16.8	16.6	11.5	11.4
YUKON	.1	.1	.0	.0	.1	.1	.1	.1
NORTHWEST TERRITORIES	.4	.3	.0	.0	.1	.1	.2	.1
CANADA	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE:

1. FOR BREAKDOWN OF FOSSIL FUELLED, SEE TABLE 1.5.

TABLE 1.3

ELECTRIC UTILITIES

PROVINCIAL INSTALLED CAPACITY AND GENERATION

BY PRIMARY ENERGY SOURCE

PERCENT OF PROVINCIAL TOTALS

1981

PROVINCE OR TERRITORY	FOSSIL FUELLED		NUCLEAR		HYDROELECTRIC		TOTAL	
	MW	GWH	MW	GWH	MW	GWH	MW	GWH
NEWFOUNDLAND	10.2	1.2	.0	.0	89.8	98.8	100.0	100.0
PRINCE EDWARD ISLAND	100.0	100.0	.0	.0	.0	.0	100.0	100.0
NOVA SCOTIA	81.7	81.7	.0	.0	18.3	18.3	100.0	100.0
NEW BRUNSWICK	66.6	54.2	.0	.0	33.4	45.8	100.0	100.0
QUEBEC	5.4	.1	1.4	.0	93.2	99.9	100.0	100.0
ONTARIO	50.8	30.3	22.3	35.5	26.9	34.3	100.0	100.0
MANITOBA	11.1	2.1	.0	.0	88.9	97.9	100.0	100.0
SASKATCHEWAN	75.4	67.4	.0	.0	24.6	32.6	100.0	100.0
ALBERTA	87.3	91.2	.0	.0	12.7	8.8	100.0	100.0
BRITISH COLUMBIA	14.9	.4	.0	.0	85.1	99.6	100.0	100.0
YUKON	37.6	24.7	.0	.0	62.4	75.3	100.0	100.0
NORTHWEST TERRITORIES	71.6	51.0	.0	.0	28.4	49.0	100.0	100.0
CANADA	34.4	20.7	7.6	11.1	58.0	68.2	100.0	100.0

NOTE:

1. FOR BREAKDOWN OF FOSSIL FUELLED, SEE TABLE 1.6.

TABLE 1.4

ELECTRIC UTILITIES

PROVINCIAL FOSSIL CAPACITY AND GENERATION

1981

PROVINCE OR TERRITORY	GENERATION(GWH)						CAPACITY (MW)		
	STEAM			INT COMB GAS TURBINE		TOTAL	MULTI FUELLED	NON MULTI FUELLED	TOTAL
	OIL	GAS	COAL						
NEWFOUNDLAND	411.8	.0	.0	96.9	3.3	512.0	.0	696.8	696.8
PRINCE EDWARD ISLAND	29.9	.0	.0	.3	.6	30.8	.0	118.2	118.2
NOVA SCOTIA	2370.1	.0	2639.7	.0	5.2	5015.1	.0	1587.5	1587.5
NEW BRUNSWICK	3335.6	.0	1144.9	.0	.1	4480.7	200.0	1559.1	1759.1
QUEBEC	-40.4	.0	.0	143.1	-1.3	101.4	.0	1054.2	1054.2
ONTARIO	250.2	25.6	31984.7	1.6	11.8	32273.9	1200.0	11556.7	12756.7
MANITOBA	.3	.6	363.2	28.6	.1	392.7	.0	455.7	455.7
SASKATCHEWAN	68.9	346.9	5806.1	8.8	11.4	6242.1	.0	1691.1	1691.1
ALBERTA	3.6	2636.4	17796.8	25.5	541.4	21003.7	.0	5055.8	5055.8
BRITISH COLUMBIA	.0	23.7	.0	151.0	-26.9	147.8	.0	1322.6	1322.6
YUKON	.0	.0	.0	95.1	.0	95.1	.0	35.1	35.1
NORTHWEST TERRITORIES	.0	.0	.0	240.1	.0	240.1	.0	111.1	111.1
CANADA	6430.0	3033.2	59735.3	791.1	545.7	70535.3	1400.0	25244.0	26644.0

NOTE:

1. GENERATION FIGURES COMBINE FOSSIL PLANT STATISTICS FROM TABLE 1.4(A),NON MULTI-FUELLED, AND 1.4(B),MULTI-FUELLED PLANTS.

2. CAPACITY FIGURES TAKEN FROM TABLE 1.4(A) AND 1.4(B).

TABLE 1.4(A)

ELECTRIC UTILITIES

PROVINCIAL INSTALLED CAPACITY AND GENERATION

FOSSIL-FUELLED EXCLUDING MULTI-FUELLED UNITS

1981

PROVINCE OR TERRITORY	STEAM						INT.COMBUST.		GAS TURBINE		TOTAL	
	OIL		GAS		COAL							
	MW	GWH	MW	GWH	MW	GWH	MW	GWH	MW	GWH	MW	GWH
NEWFOUNDLAND	450.0	411.8	.0	.0	.0	.0	76.4	96.9	170.4	3.3	696.8	512.0
PRINCE EDWARD ISLAND	70.5	29.9	.0	.0	.0	.0	6.9	.3	40.8	.6	118.2	30.8
NOVA SCOTIA	745.5	2292.1	.0	.0	637.0	2717.7	.0	.0	205.0	5.2	1587.5	5015.1
NEW BRUNSWICK	1445.9	3244.2	.0	.0	85.0	453.9	4.8	.0	23.4	.1	1559.1	3698.3
QUEBEC	600.0	-40.4	.0	.0	.0	.0	91.3	143.1	362.9	-1.3	1054.2	101.4
ONTARIO	2295.0	96.3	.0	.0	8914.0	31692.1	10.0	1.6	337.7	11.8	11556.7	31801.8
MANITOBA	132.0	-3.3	.0	.0	287.0	367.3	12.9	28.6	23.8	.1	455.7	392.7
SASKATCHEWAN	.0	.0	346.0	382.7	1233.5	5839.2	7.7	8.8	103.9	11.4	1691.1	6242.1
ALBERTA	.0	.0	1058.0	2487.4	3673.0	17949.4	41.8	25.5	283.0	541.4	5055.8	21003.7
BRITISH COLUMBIA	.0	.0	912.5	23.7	.0	.0	80.9	151.0	329.2	-26.9	1322.6	147.8
YUKON	.0	.0	.0	.0	.0	.0	35.1	95.1	.0	.0	35.1	95.1
NORTHWEST TERRITORIES	.0	.0	.0	.0	.0	.0	111.1	240.1	.0	.0	111.1	240.1
CANADA	5738.9	6030.6	2316.5	2893.7	14829.5	59019.6	479.0	791.1	1880.1	545.7	25244.0	69280.7

NOTE: 1. FOR FURTHER BREAKDOWN OF COAL AND OIL FIRED GENERATION, SEE TABLE 1.7

2. FOR TOTAL CANADIAN PICTURE SEE TABLE 1.4 WHICH COMBINES INFORMATION IN TABLES 1.4(A) AND 1.4(B)

TABLE 1.4(B)

ELECTRIC UTILITIES

PROVINCIAL INSTALLED CAPACITY AND GENERATION

MULTI-FUELLED FOSSIL UNITS ONLY

1981

PROVINCE OR TERRITORY	INSTALLED CAPACITY(MW)	ENERGY GENERATED(GWH) COAL	OIL	GAS	TOTAL
NEWFOUNDLAND	.0	.0	.0	.0	.0
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.0
NOVA SCOTIA	.0	.0	.0	.0	.0
NEW BRUNSWICK	200.0	692.8	89.7	.0	782.4
QUEBEC	.0	.0	.0	.0	.0
ONTARIO	1200.0	444.8	1.7	25.6	472.1
MANITOBA	.0	.0	.0	.0	.0
SASKATCHEWAN	.0	.0	.0	.0	.0
ALBERTA	.0	.0	.0	.0	.0
BRITISH COLUMBIA	.0	.0	.0	.0	.0
YUKON	.0	.0	.0	.0	.0
NORTHWEST TERRITORIES	.0	.0	.0	.0	.0
CANADA	1400.0	1137.5	91.4	25.6	1254.6

NOTE: 1. FOR FURTHER BREAKDOWN OF COAL AND OIL FIRED GENERATION, SEE TABLE 1.7

2. FOR TOTAL CANADIAN PICTURE SEE TABLE 1.4 WHICH COMBINES INFORMATION IN TABLES 1.4(A) AND 1.4(B)

TABLE 1.5

ELECTRIC UTILITIES

PROVINCIAL FOSSIL CAPACITY AND GENERATION

PERCENT OF CANADIAN TOTALS

1981

PROVINCE OR TERRITORY	GENERATION (GWH)						CAPACITY (MW)		
	STEAM			INT COMB GAS TURBINE		TOTAL	MULTI FUELLED	NON MULTI FUELLED	TOTAL
	OIL	GAS	COAL						
NEWFOUNDLAND	6.4	.0	.0	12.2	.6	.7	.0	2.8	2.6
PRINCE EDWARD ISLAND	.5	.0	.0	.0	.1	.0	.0	.5	.4
NOVA SCOTIA	36.9	.0	4.4	.0	1.0	7.1	.0	6.3	6.0
NEW BRUNSWICK	51.9	.0	1.9	.0	.0	6.4	14.3	6.2	6.6
QUEBEC	-.6	.0	.0	18.1	-.2	.1	.0	4.2	4.0
ONTARIO	3.9	.8	53.5	.2	2.2	45.8	85.7	45.8	47.9
MANITOBA	.0	.0	.6	3.6	.0	.6	.0	1.8	1.7
SASKATCHEWAN	1.1	11.4	9.7	1.1	2.1	8.8	.0	6.7	6.3
ALBERTA	.1	86.9	29.8	3.2	99.2	29.8	.0	20.0	19.0
BRITISH COLUMBIA	.0	.8	.0	19.1	-4.9	.2	.0	5.2	5.0
YUKON	.0	.0	.0	12.0	.0	.1	.0	.1	.1
NORTHWEST TERRITORIES	.0	.0	.0	30.4	.0	.3	.0	.4	.4
CANADA	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTE:

1. GENERATION FIGURES COMBINE FOSSIL PLANT STATISTICS FROM TABLE 1.4(A),NON MULTI-FUELLED, AND 1.4(B),MULTI-FUELLED PLANTS.

2. CAPACITY FIGURES TAKEN FROM TABLE 1.4(A) AND 1.4(B).

TABLE 1.6

ELECTRIC UTILITIES

PROVINCIAL FOSSIL CAPACITY AND GENERATION

PERCENT OF PROVINCIAL TOTALS

1981

PROVINCE OR TERRITORY	GENERATION (GWH)						CAPACITY (MW)		
	STEAM			INT COMB GAS TURBINE		TOTAL	MULTI FUELLED	NON MULTI FUELLED	TOTAL
	OIL	GAS	COAL						
NEWFOUNDLAND	80.4	.0	.0	18.9	.6	100.0	.0	100.0	100.0
PRINCE EDWARD ISLAND	97.2	.0	.0	.9	1.8	100.0	.0	100.0	100.0
NOVA SCOTIA	47.3	.0	52.6	.0	.1	100.0	.0	100.0	100.0
NEW BRUNSWICK	74.4	.0	25.6	.0	.0	100.0	11.4	88.6	100.0
QUEBEC	-39.9	.0	.0	141.2	-1.3	100.0	.0	100.0	100.0
ONTARIO	.8	.1	99.1	.0	.0	100.0	9.4	90.6	100.0
MANITOBA	.1	.1	92.5	7.3	.0	100.0	.0	100.0	100.0
SASKATCHEWAN	1.1	5.6	93.0	.1	.2	100.0	.0	100.0	100.0
ALBERTA	.0	12.6	84.7	.1	2.6	100.0	.0	100.0	100.0
BRITISH COLUMBIA	.0	16.0	.0	102.2	-18.2	100.0	.0	100.0	100.0
YUKON	.0	.0	.0	100.0	.0	100.0	.0	100.0	100.0
NORTHWEST TERRITORIES	.0	.0	.0	100.0	.0	100.0	.0	100.0	100.0
CANADA	9.1	4.3	84.7	1.1	.8	100.0	5.3	94.7	100.0

NOTE:

1. GENERATION FIGURES COMBINE FOSSIL PLANT STATISTICS FROM TABLE 1.4(A),NON MULTI-FUELLED, AND 1.4(B),MULTI-FUELLED PLANTS.

2. CAPACITY FIGURES TAKEN FROM TABLE 1.4(A) AND 1.4(B).

TABLE 1.7

ELECTRIC UTILITIES

PROVINCIAL GENERATION BY TYPE OF COAL AND OIL (GWH)

1981

PROVINCE OR TERRITORY	COAL					OIL			
	BITUMINOUS CANADIAN	BITUMINOUS IMPORTED	SUB-BITUMINOUS	LIGNITE	TOTAL COAL	LIGHT	HEAVY	DIESEL	TOTAL OIL
NEWFOUNDLAND	.0	.0	.0	.0	.0	2.0	411.8	98.2	512.0
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.0	.0	30.0	.7	30.8
NOVA SCOTIA	2639.7	.0	.0	.0	2639.7	9.8	2360.3	5.2	2375.3
NEW BRUNSWICK	1144.9	.0	.0	.0	1144.9	23.0	3312.6	.2	3335.8
QUEBEC	.0	.0	.0	.0	.0	68.9	-5.9	38.1	101.4
ONTARIO	5874.4	25796.4	.0	314.0	31984.7	167.2	95.2	.3	262.7
MANITOBA	.0	.0	.0	363.2	363.2	.3	.0	28.6	29.0
SASKATCHEWAN	.0	.0	110.9	5695.2	5806.1	68.9	.0	8.8	77.7
ALBERTA	533.5	.0	17263.3	.0	17796.8	.0	.0	10.2	10.2
BRITISH COLUMBIA	.0	.0	.0	.0	.0	-24.4	.0	93.0	68.6
YUKON	.0	.0	.0	.0	.0	.0	.0	95.1	95.1
NORTHWEST TERRITORIE	.0	.0	.0	.0	.0	.0	31.8	208.3	240.1
CANADA	10192.5	25796.4	17374.2	6372.3	59735.3	315.7	6236.3	586.7	7138.6

TABLE 1.8

ELECTRIC UTILITIES

GENERATION DATA FOR CANADA

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	13413.4	28665.7	729291.8	55.9	35988.8	10.6	54.295	1.89	20.24
-SUB BITUMINOUS	10969.9	17995.1	75562.2	5.8	17374.2	5.1	6.888	.38	4.35
-LIGNITE	5446.5	14691.2	44208.9	3.4	6372.3	1.9	8.117	.55	6.94
-TOTAL COAL	29829.8	22190.0	849052.9	65.0	59735.3	17.5	28.430	1.28	14.20
OIL									
-LIGHT	84626.7	38344.8	21178.4	1.6	315.7	.1	250.256	6.53	67.09
-HEAVY	1687055.0	41602.7	218902.3	16.8	6236.3	1.8	129.695	3.12	35.09
-DIESEL	182701.0	37757.9	49043.5	3.8	586.7	.2	268.436	7.11	83.60
-TOTAL OIL	1954382.7	41102.2	289024.1	22.2	7138.6	2.1	147.885	3.60	40.49
NATURAL GAS	1434.2	37003.2	65674.7	5.0	3661.4	1.1	45.791	1.24	17.94
URANIUM	677100.0	704578.3	101135.7	7.8	37799.0	11.1	149.366	.21	2.68
HYDROELECTRIC					232041.7	68.2			
TOTAL			1303887.3	100.0	340376.0	100.0			3.83

NOTE: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.1

ELECTRIC UTILITIES

GENERATION DATA FOR NEWFOUNDLAND

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	1976.0	37581.0	413.7	2.0	2.0	.0	209.343	5.57	206.83
-HEAVY	117509.0	41787.0	10554.8	52.2	411.8	.9	89.821	2.15	25.63
-DIESEL	33471.0	38097.2	9253.8	45.8	98.2	.2	276.473	7.26	94.26
-TOTAL OIL	152956.0	40525.2	20222.3	100.0	512.0	1.2	132.210	3.23	39.50
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					43686.6	98.8			
TOTAL			20222.3	100.0	44198.6	100.0			.46

NOTE:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES(GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.2

ELECTRIC UTILITIES

GENERATION DATA FOR PRINCE EDWARD ISLAND

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	.0	.0	.0	.0	.0	.0	.000	.00	.00
-HEAVY	17931.0	41796.4	2734.0	96.7	30.0	97.6	152.474	3.65	91.07
-DIESEL	531.0	38266.2	94.7	3.3	.7	2.4	178.311	4.66	128.30
-TOTAL OIL	18462.0	41694.9	2828.7	100.0	30.8	100.0	153.217	3.67	91.97
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					.0	.0			
TOTAL			2828.7	100.0	30.8	100.0			91.97

NOTE: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.3

ELECTRIC UTILITIES

GENERATION DATA FOR NOVA SCOTIA

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	1125.6	26521.1	46741.3	37.6	2639.7	43.0	41.704	1.57	17.78
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	1125.6	26521.1	46941.3	37.6	2639.7	43.0	41.704	1.57	17.78
OIL									
-LIGHT	3325.0	37581.0	587.3	.5	9.8	.2	176.638	4.70	60.08
-HEAVY	572927.0	41757.7	77067.5	61.7	2360.3	38.4	134.515	3.22	32.65
-DIESEL	2155.0	37581.0	249.7	.2	5.2	.1	115.851	3.08	47.75
-TOTAL OIL	578407.0	41718.1	77904.5	62.4	2375.3	38.7	134.688	3.23	32.80
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					1127.0	18.3			
TOTAL			124845.8	100.0	6142.1	100.0			20.33

NOTE:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES(GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.4

ELECTRIC UTILITIES

GENERATION DATA FOR NEW BRUNSWICK

1991

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	515.2	27552.0	24825.2	16.8	1144.9	13.3	48.181	1.75	21.68
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	515.2	27552.0	24825.2	16.8	1144.9	13.3	48.181	1.75	21.68
OIL									
-LIGHT	7312.0	38741.0	1591.3	1.1	23.0	.3	217.623	5.62	69.09
-HEAVY	903949.0	41521.5	121404.3	82.1	3312.6	40.1	134.304	3.23	36.65
-DIESEL	170.0	37641.7	28.8	.0	.2	.0	169.324	4.47	178.79
-TOTAL OIL	911431.0	41498.5	123024.3	83.2	3335.8	40.3	134.979	3.25	36.88
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					3786.6	45.8			
TOTAL			147849.5	100.0	8267.3	100.0			17.88

NOTE:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.5

ELECTRIC UTILITIES

GENERATION DATA FOR QUEBEC

1991

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	21651.0	37435.0	5383.9	44.7	68.9	.1	248.666	6.64	78.18
-HEAVY	18934.0	40771.0	2212.1	18.4	-5.5	-.0	116.830	2.87	*******
-DIESEL	15032.0	37264.1	4455.8	37.0	38.1	.0	296.424	7.95	117.10
-TOTAL OIL	55617.0	38524.5	12051.8	100.0	101.4	.1	216.692	5.62	118.89
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					84852.4	99.9			
TOTAL			12051.8	100.0	84953.8	100.0			.14

NOTES: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.6

ELECTRIC UTILITIES

GENERATION DATA FOR ONTARIO

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	11203.5	28864.6	655064.3	84.4	31670.7	29.7	58.470	2.03	20.68
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	282.1	14565.0	5783.0	.7	314.0	.3	20.502	1.37	18.42
-TOTAL COAL	11485.6	28523.2	660947.3	85.1	31984.7	30.0	57.537	2.02	20.66
OIL									
-LIGHT	30546.7	38335.0	9401.4	1.2	167.2	.2	307.771	8.03	56.24
-HEAVY	49334.0	41080.0	3915.0	.5	95.2	.1	79.375	1.93	41.11
-DIESEL	93.0	37697.0	27.5	.0	.3	.0	295.366	7.84	93.75
-TOTAL OIL	79973.7	40027.9	13344.7	1.7	262.7	.2	166.864	4.17	50.80
NATURAL GAS	9.1	37114.1	1111.7	.1	26.5	.0	122.040	3.29	41.90
URANIUM	677100.0	704578.3	101135.7	13.0	37799.0	35.5	149.366	.21	2.68
HYDROELECTRIC					36504.3	34.3			
TOTAL			776439.3	100.0	106577.3	100.0			7.29

NOTES: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.7

ELECTRIC UTILITIES

GENERATION DATA FOR MANITOBA

1991

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	321.3	16266.6	5382.3	70.5	363.2	2.0	16.750	1.03	14.82
-TOTAL COAL	321.3	16266.6	5382.3	70.5	363.2	2.0	16.750	1.03	14.82
OIL									
-LIGHT	314.0	37936.9	66.8	.9	.3	.0	212.678	5.61	215.42
-HEAVY	.0	.0	.0	.0	.0	.0	.000	.00	.00
-DIESEL	8820.0	38276.0	2167.5	28.4	28.6	.2	245.748	6.42	75.68
-TOTAL OIL	9134.0	38264.3	2234.3	29.3	29.0	.2	244.611	6.39	77.17
NATURAL GAS	.2	37222.0	20.8	.3	.6	.0	96.912	2.60	36.17
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					17899.1	97.9			
TOTAL			7637.4	100.0	18291.8	100.0			.42

NOTES: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 3.8

ELECTRIC UTILITIES

GENERATION DATA FOR SASKATCHEWAN

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	94.9	18135.0	2189.2	4.1	110.9	1.2	23.063	1.27	19.73
-LIGNITE	4843.1	14570.7	33043.6	62.2	5695.2	61.5	6.823	.47	5.80
-TOTAL COAL	4938.0	14639.2	35231.9	66.4	5806.1	62.7	7.135	.49	6.07
OIL									
-LIGHT	1904.0	39440.0	3696.6	7.0	68.9	.7	193.699	4.91	53.66
-HEAVY	5.0	41760.0	.6	.0	.0	.0	125.000	2.99	48.08
-DIESEL	3461.0	38277.0	907.3	1.7	8.9	.1	262.150	6.85	103.91
-TOTAL OIL	22550.0	39262.0	4604.5	8.7	77.7	.9	204.190	5.20	59.28
NATURAL GAS	148.0	37548.4	13250.9	25.0	358.3	3.9	89.510	2.38	36.98
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					3015.0	32.6			
TOTAL			53087.0	100.0	9257.1	100.0			5.73

NOTES: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 3.8

ELECTRIC UTILITIES

GENERATION DATA FOR ALBERTA

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	569.0	30000.0	1451.0	1.2	533.5	2.3	2.550	.08	2.72
-SUB BITUMINOUS	10875.0	17993.9	73374.1	59.9	17263.3	74.9	6.747	.37	4.25
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	11444.1	18590.9	74825.0	60.0	17796.8	77.2	6.538	.35	4.20
OIL									
-LIGHT	.0	.0	.0	.0	.0	.0	.000	.00	.00
-HEAVY	.0	.0	.0	.0	.0	.0	.000	.00	.00
-DIESEL	3879.0	37856.2	812.8	.7	10.2	.0	209.537	5.54	79.87
-TOTAL OIL	3879.0	37856.2	812.8	.7	10.2	.0	209.537	5.54	79.87
NATURAL GAS	1149.7	36894.5	48978.4	39.3	3196.7	13.9	42.599	1.15	15.32
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					2035.4	8.8			
TOTAL			124616.2	100.0	23039.1	100.0			5.41

NOTE:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES(GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 2.10

ELECTRIC UTILITIES

GENERATION DATA FOR BRITISH COLUMBIA

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	418.0	39184.6	37.5	.4	-24.4	-.1	89.773	2.29	*******
-HEAVY	.0	.0	.0	.0	.0	.0	.000	.00	.00
-DIESEL	30032.0	36123.8	7426.7	76.0	93.0	.2	247.292	6.85	79.86
-TOTAL OIL	30450.0	36165.8	7464.2	76.3	68.6	.2	245.130	6.78	108.80
NATURAL GAS	127.1	37343.5	2313.0	23.7	79.2	.2	18.193	.49	29.20
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					38614.7	99.6			
TOTAL			9777.2	100.0	38762.5	100.0			.25

NOTES:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES(GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 3.11

ELECTRIC UTILITIES

GENERATION DATA FOR YUKON

1991

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $('000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	.0	.0	.0	.0	.0	.0	.000	.00	.00
-HEAVY	.0	.0	.0	.0	.0	.0	.000	.00	.00
-DIESEL	27546.0	38192.2	8212.6	100.0	95.1	24.7	298.142	7.81	86.34
-TOTAL OIL	27546.0	38192.2	8212.6	100.0	95.1	24.7	298.142	7.81	86.34
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					290.0	75.3			
TOTAL			8212.6	100.0	385.1	100.0			21.32

NOTES:(1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES(GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 7.12

ELECTRIC UTILITIES

GENERATION DATA FOR NORTHWEST TERRITORIES

1981

FUEL	QUANTITY CONSUMED (1)	AVERAGE HEAT CONTENT (2)	COST $(*000)	% TOTAL FUEL COST	GENERATION GWH	% TOTAL GENERATION	COST/UNIT QUANTITY (3)	COST $/GJ	MILLS/ KWH
COAL									
-BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-SUB BITUMINOUS	.0	.0	.0	.0	.0	.0	.000	.00	.00
-LIGNITE	.0	.0	.0	.0	.0	.0	.000	.00	.00
-TOTAL COAL	.0	.0	.0	.0	.0	.0	.000	.00	.00
OIL									
-LIGHT	.0	.0	.0	.0	.0	.0	.000	.00	.00
-HEAVY	6466.0	41757.0	813.1	5.6	31.8	6.8	141.222	3.38	28.71
-DIESEL	57511.0	38219.2	15406.3	94.4	209.3	44.3	267.885	7.01	73.96
-TOTAL OIL	63977.0	39576.8	16219.5	100.0	240.1	51.0	255.083	6.61	67.96
NATURAL GAS	.0	.0	.0	.0	.0	.0	.000	.00	.00
URANIUM	.0	.0	.0	.0	.0	.0	.000	.00	.00
HYDROELECTRIC					230.6	49.0			
TOTAL			16319.5	100.0	470.7	100.0			34.67

NOTES: (1) QUANTITY CONSUMED IS MEASURED IN THOUSANDS OF TONNES (COAL), KILOLITRES (OIL), MILLIONS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

(2) AVERAGE HEAT CONTENT IS MEASURED IN KILOJOULES/KILOGRAM (COAL), KILOJOULES/LITRE (OIL), KILOJOULES/CUBIC METRE (GAS), AND KILOJOULES/GRAM (CONTAINED URANIUM)

(3) UNIT QUANTITY IS MEASURED IN TONNES (COAL), KILOLITRES (OIL), THOUSANDS OF CUBIC METRES (GAS), AND KILOGRAMS (CONTAINED URANIUM)

TABLE 3.1

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

BITUMINOUS COAL

1981

PROVINCE OR TERRITORY	QUANTITY TONNES	HEAT CONTENT KJ/KG	COST THOUSAND $	GENERATION GWH	COST $/TONNE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	.0	.0	.0	.0	.000	.000	.00
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	1125571.0	26521.1	46941.3	2639.7	41.704	1.573	17.78
NEW BRUNSWICK	515244.0	27552.0	24425.2	1144.0	48.181	1.749	21.68
QUEBEC	.0	.0	.0	.0	.000	.000	.00
ONTARIO	11203515.0	28944.6	655064.3	31670.7	58.470	2.026	20.68
MANITOBA	.0	.0	.0	.0	.000	.000	.00
SASKATCHEWAN	.0	.0	.0	.0	.000	.000	.00
ALBERTA	568037.0	30000.0	1451.0	533.5	2.550	.085	2.72
BRITISH COLUMBIA	.0	.0	.0	.0	.000	.000	.00
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	13413367.0	28065.7	728281.8	35988.9	54.295	1.894	20.24

TABLE 3.2

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

SUB-BITUMINOUS COAL

1981

PROVINCE OR TERRITORY	QUANTITY TONNES	HEAT CONTENT KJ/KG	COST THOUSAND $	GENERATION GWH	COST $/TONNE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	.0	.0	.0	.0	.000	.000	.00
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	.0	.0	.0	.0	.000	.000	.00
NEW BRUNSWICK	.0	.0	.0	.0	.000	.000	.00
QUEBEC	.0	.0	.0	.0	.000	.000	.00
ONTARIO	.0	.0	.0	.0	.000	.000	.00
MANITOBA	.0	.0	.0	.0	.000	.000	.00
SASKATCHEWAN	94879.0	18135.0	2198.2	110.9	23.063	1.272	19.73
ALBERTA	10875050.0	17993.9	73374.1	17263.3	6.747	.375	4.25
BRITISH COLUMBIA	.0	.0	.0	.0	.000	.000	.00
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	10969929.0	17995.1	75562.2	17374.2	6.888	.383	4.35

TABLE 3.3

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

LIGNITE

1991

PROVINCE OR TERRITORY	QUANTITY TONNES	HEAT CONTENT KJ/KG	COST THOUSAND $	GENERATION GWH	COST $/TONNE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	.0	.0	.0	.0	.000	.000	.00
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	.0	.0	.0	.0	.000	.000	.00
NEW BRUNSWICK	.0	.0	.0	.0	.000	.000	.00
QUEBEC	.0	.0	.0	.0	.000	.000	.00
ONTARIO	282066.0	14965.0	5783.0	314.0	20.502	1.370	18.42
MANITOBA	321335.0	16266.6	5382.3	363.2	16.750	1.030	14.82
SASKATCHEWAN	4843099.0	14570.7	33043.6	5695.2	6.823	.468	5.80
ALBERTA	.0	.0	.0	.0	.000	.000	.00
BRITISH COLUMBIA	.0	.0	.0	.0	.000	.000	.00
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	5446500.0	14691.2	44208.2	6372.3	8.117	.553	6.94

TABLE 3.4

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

LIGHT OIL

1981

PROVINCE OR TERRITORY	QUANTITY KILOLITRES	HEAT CONTENT KJ/LITRE	COST THOUSAND $	GENERATION GWH	COST $/KILOLITRE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	1976.0	37591.0	413.7	2.0	209.343	5.570	206.83
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	3325.0	37591.0	587.3	9.8	176.638	4.700	60.09
NEW BRUNSWICK	7312.0	38741.0	1591.3	23.0	217.623	5.617	69.09
QUEBEC	21651.0	37435.0	5383.9	68.9	248.666	6.643	78.18
ONTARIO	30546.7	38335.9	9401.4	167.2	307.771	8.028	56.24
MANITOBA	314.0	37996.9	66.8	.3	212.678	5.606	215.42
SASKATCHEWAN	19094.0	39440.0	3696.6	68.9	193.699	4.911	53.66
ALBERTA	.0	.0	.0	.0	.000	.000	.00
BRITISH COLUMBIA	418.0	39184.6	37.5	-24.4	89.773	2.291	******
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	84626.7	38344.8	21178.4	315.7	250.256	6.526	67.09

TABLE 3.5

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

HEAVY OIL

1981

PROVINCE OR TERRITORY	QUANTITY KILOLITRES	HEAT CONTENT KJ/LITRE	COST THOUSAND $	GENERATION GWH	COST $/KILOLITRE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	117509.0	41797.0	10554.8	411.8	89.821	2.150	25.63
PRINCE EDWARD ISLAND	17931.0	41796.4	2734.0	30.0	152.474	3.648	91.07
NOVA SCOTIA	572927.0	41757.7	77067.5	2360.3	134.515	3.221	32.65
NEW BRUNSWICK	903949.0	41521.5	121404.3	3312.6	134.304	3.235	36.65
QUEBEC	18934.0	40771.0	2212.1	-5.5	116.830	2.866	******
ONTARIO	49334.0	41080.0	3915.9	85.2	79.375	1.932	41.11
MANITOBA	.0	.0	.0	.0	.000	.000	.00
SASKATCHEWAN	5.0	41760.0	.6	.0	125.000	2.993	48.08
ALBERTA	.0	.0	.0	.0	.000	.000	.00
BRITISH COLUMBIA	.0	.0	.0	.0	.000	.000	.00
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	6466.0	41757.0	813.1	31.8	141.222	3.382	28.71
CANADA	1687055.0	41602.7	218802.3	6236.3	129.695	3.117	35.09

TABLE 3.6

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

DIESEL OIL

1981

PROVINCE OR TERRITORY	QUANTITY KILOLITRES	HEAT CONTENT KJ/LITRE	COST THOUSAND $	GENERATION GWH	COST $/KILOLITRE	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	33471.0	39097.2	9253.8	98.2	276.473	7.257	94.26
PRINCE EDWARD ISLAND	531.0	38266.2	94.7	.7	178.311	4.660	128.30
NOVA SCOTIA	2155.0	37501.0	249.7	5.2	115.851	3.093	47.75
NEW BRUNSWICK	170.0	37841.7	28.8	.2	169.324	4.475	178.79
QUEBEC	15032.0	37264.1	4455.8	38.1	296.424	7.955	117.10
ONTARIO	93.0	37697.0	27.5	.3	295.366	7.835	93.75
MANITOBA	8820.0	38276.0	2167.5	28.6	245.748	6.420	75.68
SASKATCHEWAN	3461.0	38277.0	907.3	8.8	262.150	6.849	103.51
ALBERTA	3879.0	37856.2	812.8	10.2	209.537	5.535	79.87
BRITISH COLUMBIA	30032.0	36123.8	7426.7	93.0	247.292	6.846	79.86
YUKON	27546.0	38192.2	8212.6	85.1	298.142	7.806	86.34
NORTHWEST TERRITORIES	57511.0	38219.2	15406.3	208.3	267.885	7.009	73.96
CANADA	182701.0	37757.8	49043.5	596.7	268.436	7.109	83.60

TABLE 3.7

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

NATURAL GAS

1981

PROVINCE OR TERRITORY	QUANTITY MILLION CU M	HEAT CONTENT KJ/CU M	COST THOUSAND $	GENERATION GWH	COST $/THOUS CU M	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	.0	.0	.0	.0	.000	.000	.00
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	.0	.0	.0	.0	.000	.000	.00
NEW BRUNSWICK	.0	.0	.0	.0	.000	.000	.00
QUEBEC	.0	.0	.0	.0	.000	.000	.00
ONTARIO	9.1	37114.1	1111.7	26.5	122.040	3.288	41.90
MANITOBA	.2	37222.0	20.8	.6	96.912	2.604	36.17
SASKATCHEWAN	148.0	37549.4	13250.8	358.3	89.510	2.384	36.99
ALBERTA	1149.7	36894.5	48978.4	3196.7	42.599	1.155	15.32
BRITISH COLUMBIA	127.1	37343.5	2313.0	79.2	18.193	.487	29.20
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	1434.2	37007.2	65674.7	3661.4	45.791	1.237	17.94

TABLE 7.0

ELECTRIC UTILITIES

PROVINCIAL CONSUMPTION AND COST

URANIUM

1991

PROVINCE OR TERRITORY	QUANTITY KILOGRAMS	HEAT CONTENT KJ/GRAM	COST THOUSAND $	GENERATION GWH	COST $/KG	COST $/GJ	COST MILLS/KWH
NEWFOUNDLAND	.0	.0	.0	.0	.000	.000	.00
PRINCE EDWARD ISLAND	.0	.0	.0	.0	.000	.000	.00
NOVA SCOTIA	.0	.0	.0	.0	.000	.000	.00
NEW BRUNSWICK	.0	.0	.0	.0	.000	.000	.00
QUEBEC	.0	.0	.0	.0	.000	.000	.00
ONTARIO	677100.0	704578.3	101135.7	37799.0	149.366	.212	2.68
MANITOBA	.0	.0	.0	.0	.000	.000	.00
SASKATCHEWAN	.0	.0	.0	.0	.000	.000	.00
ALBERTA	.0	.0	.0	.0	.000	.000	.00
BRITISH COLUMBIA	.0	.0	.0	.0	.000	.000	.00
YUKON	.0	.0	.0	.0	.000	.000	.00
NORTHWEST TERRITORIES	.0	.0	.0	.0	.000	.000	.00
CANADA	677100.0	704578.3	101135.7	37799.0	149.366	.212	2.68

TABLE 6.1

GNP, ELECTRICAL ENERGY CONSUMPTION AND POPULATION FOR CANADA

Year	GNP ($1971\$ \times 10^9$)	(1) GNP ($1961\$ \times 10^9$)	(2) Elec. Consump. ($kW.h \times 10^9$)	Populat. ($cap. \times 10^6$)	GNP/Capita (1961 $)	Consump./Cap. (kW.h)
1961	54.741	39.646	110.950	18.238	2173.8	6083.5
1962	58.473	42.349	116.135	18.583	2278.9	6249.5
1963	61.486	44.531	121.510	18.931	2352.3	6418.6
1964	65.610	47.519	133.949	19.290	2462.9	6944.0
1965	69.981	50.685	144.165	19.644	2580.2	7338.9
1966	74.844	54.207	156.956	20.015	2708.3	7841.9
1967	77.344	56.016	165.812	20.378	2748.3	8136.8
1968	81.864	59.292	175.849	20.701	2864.2	8494.7
1969	86.225	62.448	188.648	21.001	2973.6	8982.8
1970	88.390	64.014	201.298	21.297	3005.8	9451.9
1971	94.450	68.405	211.492	21.568	3171.6	9805.8
1972	100.248	72.604	231.557	21.802	3330.2	10620.9
1973	107.812	78.082	249.298	22.042	3542.4	11310.1
1974	111.678	80.882	267.298	22.364	3616.6	11952.2
1975	113.005	81.843	265.955	22.697	3605.9	11717.6
1976	119.116	86.269	284.829	22.992	3752.0	12387.6
1977	121.949	88.321	299.929	23.258	3797.4	12895.7
1978	126.127	91.347	316.827	23.481	3889.9	13491.8
1979	129.826	94.026	323.469	23.672	3972.0	13664.6
1980	130.160	94.268	340.068	23.936	3938.3	14207.4
1981	134.540	97.440	346.332	24.189	4028.3	14317.7

Refs. 6, 7, 9 and 11

(1) GNP in 1971 dollars divided by 1.38075 (the 1971$/1961$ ratio for the years 1961 to 1970)

(2) Total Made Available in Canada

TABLE 6.2

AVERAGE SELLING PRICE OF ELECTRICITY

Year	Revenue 10^6	Sales (1) 10^6 kW.h	Mills/kW.h (current $)	C.P.I. Deflator (2)	Mills/kW.h (1971 $)
1970	1,716	137,972	12.4	.972	12.8
1971	1,878	147,203	12.8	1.000	12.8
1972	2,065	162,729	12.7	1.048	12.1
1973	2,326	177,724	13.1	1.127	11.6
1974	2,677	193,329	13.8	1.250	11.0
1975	3,114	194,571	16.0	1.385	11.6
1976	3,852	213,612	18.0	1.489	12.1
1977	4,842	226,004	21.4	1.608	13.3
1978	5,612	235,975	23.8	1.752	13.6
1979	6,425	245,537	26.2	1.912	13.7
1980	7,355	254,684	28.9	2.106	13.7
1981	8,371	265,930	31.5	2.369	13.3

Refs 5 and 12

(1) Total sales to ultimate customers

(2) C.P.I. Deflator in 1971$